APPLICATION FOR BATTERY SAFETY

On Behalf of

TORNADO SCIENCE GROUPS LIMITED

Lithium ion Battery Pack

锂离子电池组

TDP-12V12A

Prepared for : TORNADO SCIENCE GROUPS LIMITED

申 请 飓风科技集团有限公司

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World Standardization Certification & Testing (Shenzhen) Co., Ltd 深圳市世标检测有限公司 WSCT 检验专用章 (1)

Date of Test 测试日期: May.24,2014 to Jun.14,2014

Date of Report 报告日期: Jan.15,2015

Report Number 报告号: WSCT1501000551BS

Battery Report
UN38.3

Report reference No ..... 报告号	WSCT1501000551BS	
Tested by (+ signature) ..... 测试(签名)	孙黎明	孙黎明
Checked by (+ signature) ..... 审核(签名)	李文君	李文君
Approved by (+ signature) ..... 批准(签名)	王凤兵	王凤兵
Date of issue ..... 签发日期	Jan.15, 2015 2015年01月15日	
Testing Laboratory Name ..... 测试实验室	World Standardization Certification & Testing Co., Ltd. 深圳市世标检测有限公司	
Address ..... 地址	Building A, Baoshi Science & Technology Park, Baoshi Road, Bao'an District, Shenzhen, Guangdong, China 深圳市宝安区宝石路宝石科技园A栋	
Applicant's Name : 申请商	TORNADO SCIENCE GROUPS LIMITED 飓风科技集团有限公司	
Address ..... 地址	1-1-402，NanKai Industrial Zone,Tianjin,P.R.China 天津市南开区工业园1-1-402	
Manufacturer ..... 制造商	TORNADO SCIENCE GROUPS LIMITED 飓风科技集团有限公司	
Address ..... 地址	1-1-402，NanKai Industrial Zone,Tianjin,P.R.China 天津市南开区工业园1-1-402	
Standard..... 标准	Section 38.3 of the Fifth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.5 Section 38.3/Amend.1) 《关于危险品货物运输的建议书》第五修订版修正1 第38.3 节	
Test item description 测试项目描述	Lithium ion Battery Pack 锂离子电池组	

Trade Mark ..... 商标	ENERBYTE
Model/type reference ..... 型号/引用型号	TDP-12V12A
Ratings ..... 额定值	12V,12Ah
Classification ..... 类别	Lithium ion Battery Pack 锂离子电池组
Type of cell ..... 电池芯形状	Cuboid 长方体
Limited charge Voltage ..... 充电限制电压	12.8V
Dimension of battery ..... 电池尺寸	Dimension 105mm×105mm×155mm
Charge Current ..... 充电电流	2A
Maximum Continuous Charge Current..... 最大连续充电电流	4A
End Charge Current ..... 充电截止电流	2A
Cut-off Voltage..... 终止电压	10V
Discharge Current ..... 放电电流	10A
Maximum Discharge Current..... 最大放电电流	15A
Rated Capacity..... 额定容量	12Ah
Possible test case verdicts: 报告中可能用到的结论标识：	

Test case does not apply to the test object..... 测试项目不适用于该产品:	N/A 不适用
Test item does meet the requirement. 测试项目符合标准的要求	P(ass) 合格
Test item does not meet the requirement..... 测试项目不符合标准的要求	F(ail) 不合格
Testing: 测试:	
Date of sample received.....: 样品接收日期：	May.24, 2014 2014年5月24日
Date(s) of performance of test.....: 测试执行日期	May.24,2014 to Jun.14 2014 2014年5月24日至2014年6月14日

Test conclusion:**检验结论**

The Rechargeable Lithium ion Battery Pack by TORNADO SCIENCE GROUPS LIMITED are tested according to Section 38.3 of the Fifth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria**(ST/SG/AC.10/11/Rev.5 Section 38.3/Amend.1).**

由飓风科技集团有限公司送检的可充电锂离子电池组，依据《关于危险品货物运输的建议书》第五修订版修正1 第38.3 节进行检测。

Test result: Pass

检验结果: 通过

Ⅰ、CONCLUSION 结论

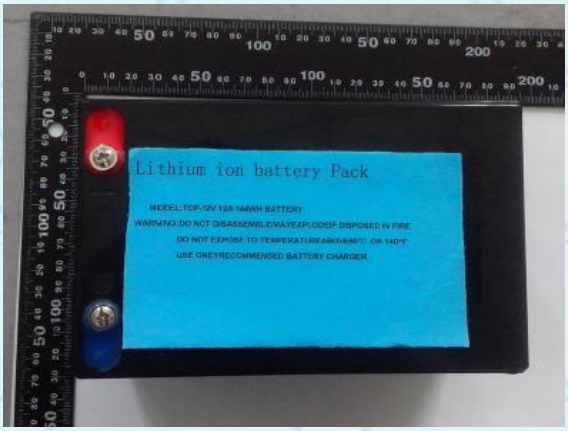
ITEM项目	SAMPLE NUMVER样品号	STANDARD标准	CONCLUSION结论
Altitude simulation 高空模拟	B1-B8	Section 38.3 of the Fifth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.5 Section 38.3/Amend.1) 《关于危险品货物运输的建议书》第五修订版修正1第38.3 节	PASS 合格
Thermal test 耐热测试			PASS 合格
Vibration 振动测试			PASS 合格
Shock 冲击测试			PASS 合格
External short circuit 外部短路			PASS 合格
Crush 挤压测试	C1-C5		PASS 合格
Overcharge 过充电测试	B9-B16		PASS 合格
Forced discharge 强制放电测试	C6-C25		PASS 合格

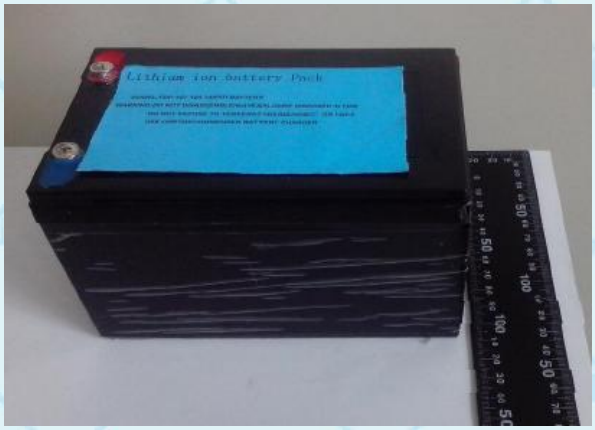
Notes备注:

The conditions of the batteries of sample No. B1# to B4# and B9# to B12# are at first cycle in fully charged state;
样品编号B1-B4和B9-B12的状态为第一个交替充电放电周期完全充电状态的移动电源;
The conditions of the batteries of sample No. C1# to C5# are at first cycle at 50% of the design rated capacity, in fully charged state;
样品编号C1-C5的状态为第一个交替充电放电周期完全充电状态电芯容量设计值的50%的电芯;
The conditions of the batteries of sample No.B5# to B8# and B13# to B16# are full charged after fifty cycle;
样品编号B5-B8和B13-B16的状态为在五十个交替充电放电周期结束后完全充电状态的移动电源;
The conditions of the cells of sample No.C6# to C15# are at first cycle, in fully discharged state;
样品编号C6-C15的状态为第一个交替充电放电周期完全放电状态的电芯;
The conditions of the cells of sample No.C16# to C25# are after fifty cycles ending in fully discharged state.
样品编号C16-C25的状态为在五十个交替充电放电周期结束后完全放电状态的电芯。

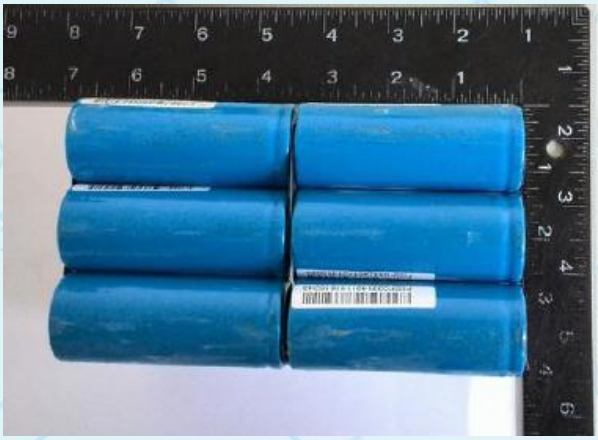
Ⅱ、THE PHOTO OF SAMPLE 样品图片

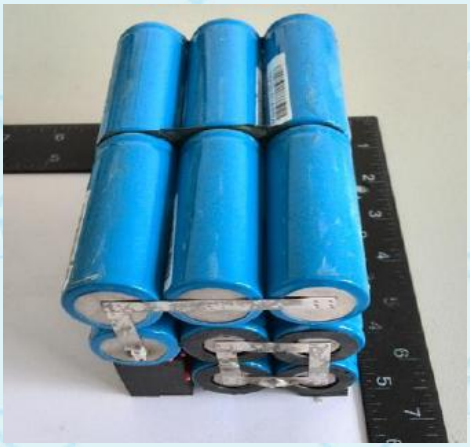
Battery电池





Cell 电芯





III、MAIN TEST EQUIPMENT 主要测试设备

NO.编号	Instrument Name 仪器名称
WSCTBS-013	High precision battery test system 高精度电池测试系统
WSCTBS-006	Simulated altitude low pressure chamber 模拟高空低压试验箱
WSCTBS-004	Temperature cycling tester温度循环试验箱
WSCTBS-008	Electric vibration test system电动振动实验系统
WSCTBS-017	Drop style shock table跌落式冲击台
WSCTBS-003	Temperature control type battery short circuit testing machine 温控型电池短路试验机
WSCTBS-015/016	Programmable DC power supply 可程控直流电源
WSCTBS-001	Power battery crush tester 动力电池挤压试验机
WSCTR-004	Scales 天平
WSCTS-014	Digital multimeter 数字多用表
WSCTS-117	Thermocouple 热电偶
WSCTBS-012	Drop tester 跌落试验机

IV、TEST METHOD AND DATE 测试方法和数据

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

小型电池或电池组必须按顺序进行试验T1至T5。试验T6至T8应使用未另外试验过的电池或电池组。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组进行，以便测试交替充电放电的电池组。

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

$$Mass\ loss(\%) = (M_1 - M_2)/M_i \times 100$$

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

质量损失量化数值可用下式计算：

$$质量损失（\%）= (M_1 - M_2)/M_i \times 100$$

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

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

Test T.1: Altitude simulation 高度模拟

Test procedure 试验程序：

Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 ±5 ℃).
试验电池和电池组在压力不大于11.6kPa和温度20℃±5℃的环境下存放至少6小时。

Requirement 要求：

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.
样品（电池）应无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放完电的电池和电芯。

Date 数据：

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压损失 (%)	Verdict#（判定#）
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
B1	1647.6	11.98	1647.6	11.98	0.000	0.00	PASS/合格
B2	1649.6	11.97	1649.4	11.97	0.012	0.00	PASS/合格
B3	1648.2	11.97	1648.2	11.97	0.000	0.00	PASS/合格
B4	1647.7	11.97	1647.7	11.97	0.000	0.00	PASS/合格
B5	1648.5	11.97	1648.5	11.97	0.000	0.00	PASS/合格
B6	1649.1	11.98	1649.1	11.98	0.000	0.00	PASS/合格
B7	1647.5	11.98	1647.3	11.98	0.012	0.00	PASS/合格
B8	1647.8	11.98	1647.8	11.98	0.000	0.00	PASS/合格

#：No leakage, no venting,no disassembly ,no rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

Test T.2: Thermal test 耐热测试

Test procedure 测试程序：

Test cells and batteries are to be stored for at least six hours at a test temperature equal to72 ±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.
试验电池和电池组在试验温度等于72℃±2℃下存放至少6小时，接着在试验温度等于-40℃±2℃下存放至少6小时。两个极端温度之间的最大时间间隔为30分钟。这一过程须重复10次，接着将所有电池在环境温度20℃±5℃下存放24小时。对于大型电池和电池组，暴露于极端试验温度的时间至少应为12小时。

Requirement 要求：

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.
样品（电池）应无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％, 此要求不适用于完全放完电的电池和电芯。

Date 数据：

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压损失 (%)	Verdict#（判定#）
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
B1	1647.6	11.98	1647.2	11.76	0.024	1.84	PASS/合格
B2	1649.4	11.97	1648.6	11.76	0.049	1.75	PASS/合格
B3	1648.2	11.97	1647.5	11.76	0.042	1.75	PASS/合格
B4	1647.7	11.97	1647.2	11.76	0.030	1.75	PASS/合格
B5	1648.5	11.97	1648.1	11.76	0.024	1.75	PASS/合格
B6	1649.1	11.98	1648.4	11.78	0.042	1.67	PASS/合格
B7	1647.3	11.98	1646.7	11.77	0.036	1.75	PASS/合格
B8	1647.8	11.98	1647.4	11.76	0.024	1.84	PASS/合格

#：No leakage, no venting,no disassembly ,no rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

Test T.3: Vibration 振动

Test procedure 测试程序：

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

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

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

For large batteries: from 7 Hz a peak acceleration of 1 g_n is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 g_n occurs (approximately 25 Hz).A peak acceleration of 2 g_n is then maintained until the frequence is increased to 200 Hz.

电池和电池组紧固于振动机平台，但不得造成电池变形，并能准确可靠地传播振动。振动应是正弦波形，对数扫描频率在7赫兹和200赫兹之间，再回到7赫兹，跨度为15分钟。这一振动过程须对三个互相垂直的电池安装方位的每一个方向重复进行12次，总共为时3小时。

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

对电池和小型电池组：从7赫兹开始，保持1g_n 的最大加速度，直到频率达到18赫兹。然后将振奋保持在0.8毫米（总偏移1.6毫米），并增加频率直到最大加速度达到8g_n（频率约为50赫兹）。将最大加速度保持在8g_n直到频率增加到200赫兹。

对大型电池组：从7赫兹开始，保持1g_n 的最大加速度，直到频率达到18赫兹。然后将振奋保持在0.8毫米（总偏移1.6毫米），并增加频率直到最大加速度达到2g_n（频率约为25赫兹）。将最大加速度保持在2g_n直到频率增加到200赫兹。

Requirement 要求：

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

如果试验中和试验后无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在第三个垂直安装方位上的试验后立即测得的开路电压不小于在进行这一试验前电压的90%，电池和电池组即符合本项要求。有关电压的要求不适用与完全放电状态的试验电池和电池组。

Date 数据：

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压损失 (%)	Verdict#（判定#）
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
B1	1647.2	11.76	1647.2	11.75	0.000	0.09	PASS/合格
B2	1648.6	11.76	1648.6	11.76	0.000	0.00	PASS/合格
B3	1647.5	11.76	1647.5	11.76	0.000	0.00	PASS/合格
B4	1647.2	11.76	1647.2	11.76	0.000	0.00	PASS/合格
B5	1648.1	11.76	1648.0	11.76	0.006	0.00	PASS/合格
B6	1648.4	11.78	1648.4	11.77	0.000	0.08	PASS/合格
B7	1646.7	11.77	1646.7	11.76	0.000	0.08	PASS/合格
B8	1647.4	11.76	1647.4	11.76	0.000	0.00	PASS/合格

#：No leakage, no venting,no disassembly ,no rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

Test T.4: Shock 冲击

Test procedure测试程序:

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell or battery shall be subjected to a halfsine shock of peak acceleration of 150 g_n and pulse duration of 6 milliseconds. Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of 50 g_n and pulse duration of 11 milliseconds. Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

试验电池和电池组用坚硬支架紧固在试验装置上，支架支撑着每个试验电池组的所有安装面。每个电池和电池组须经受最大加速度150g_n 和脉冲持续时间6毫秒的半正弦波冲击。每个电池或电池组须在三个互相垂直的电池或电池组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。

不过，大型电池和大型电池组须经受最大加速度50g_n和脉冲持续时间11毫秒的半正弦波冲击。每个电池或电池组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:

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage

immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

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

Date 数据：

No.编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage loss 电压损失 (%)	Verdict#（判定#）
	Mass(g) 质量(g)	Voltage(V) 电压(V)	Mass(g) 质量(g)	Voltage(V) 电压(V)			
B1	1647.2	11.75	1647.2	11.75	0.000	0.00	PASS/合格
B2	1648.6	11.76	1648.5	11.76	0.006	0.00	PASS/合格
B3	1647.5	11.76	1647.5	11.76	0.000	0.00	PASS/合格
B4	1647.2	11.76	1647.2	11.76	0.000	0.00	PASS/合格
B5	1648.0	11.76	1648.0	11.76	0.000	0.00	PASS/合格
B6	1648.4	11.77	1648.4	11.76	0.000	0.08	PASS/合格
B7	1646.7	11.76	1646.6	11.76	0.006	0.00	PASS/合格
B8	1647.4	11.76	1647.4	11.76	0.000	0.00	PASS/合格

#：No leakage, no venting,no disassembly ,no rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

Test T.5: External short circuit 外短路测试

Test procedure 测试程序:

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 55 ± 2 ℃ and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 55 ±2 ℃. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55 ±2 ℃.

试验电芯和电池在55℃±2℃的环境温度下，经受外电阻小于0. 1欧姆的短路试验，短路时间持续到电池壳温度恢复到55℃±2℃后继续至少1小时。要求电池外壳温度不超过170℃，并且试验后6小时内无解体、无破裂和无起火。

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 the test. 如果电芯和电池外表面温度不超过170℃，6 小时内无着火，无破裂，无解体，那么电芯和电池适合这要求.

Date 数据：

No.编号	Peak temperature(℃)最高温度	No disassembly,No rupture and no fire无解体、无破裂和无起火
B1	55.2	PASS/合格
B2	55.8	PASS/合格
B3	55.4	PASS/合格
B4	56.1	PASS/合格
B5	55.7	PASS/合格
B6	55.6	PASS/合格
B7	55.4	PASS/合格
B8	55.1	PASS/合格

Test T.6: Impact (applicable to cylindrical cells greater than 20 mm in diameter) / Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 20 mm in diameter)撞击(适用于直径大于20 毫米的圆柱形电池)/挤压(适用于棱柱形、袋装、硬币/ 纽扣电池和直径不超过20 毫米的圆柱形电池)

Test procedure 测试程序– Impact撞击 ：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.

将试验电池或元件电池放在平坦光滑平面上，将一根316 型不锈钢棒横放在试样中心后，将一质量为9.1kg 的物体从61±2.5cm 的高度落向样品。待试电池纵轴与平面平行，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。每个样品只经受一次撞击 。

Test Procedure测试程序 – Crush挤压： 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;

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

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

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

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

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

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厘米/秒。挤压持续进行，直到出现以下三种情况之一：

(a)施加的力量达到13千牛± 0.78千牛；

(b)电池的电压下降至少100毫伏；

(c)电池变形达原始厚度的50%或以上。

棱柱形或袋装电池应从最宽的一面施压，纽扣/硬币形电池应从其平坦表面施压，圆柱形电池应从与纵轴垂直的方向施压。每个样品只经受一次挤压 。

Requirement 要求:

Cells 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 this test. 电芯或电池的最高表面温度应不超过170℃，试验结束后6 个小时之内，电芯和聚合物电芯应无分解和无着火现象发生。

Date 数据:

No.编号	Peak temperature最高温度(℃)	No disassembly,No fire 无解体、无着火
C1	25.4	PASS/合格
C2	25.8	PASS/合格
C3	25.5	PASS/合格
C4	25.3	PASS/合格
C5	25.9	PASS/合格

Test T.7: Overcharge 过度充电

Test procedure 测试程序:

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

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

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

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

以2 倍制造厂推荐的最大持续充电电流对样品充电，本测试最小电压为:

(a)如果厂家推荐的充电电压不超过18V，本测试的最小充电电压应该小于两倍的厂家标定最大充电电压或者是22V

(b) 如果厂家推荐的充电电压超过18V，本测试的最小充电电压应该1.2倍的厂家标定最大充电电压

20±5℃的环境温度下，试验持续24 小时。

Requirement 要求:

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

试验样品在试验中和试验后7天内，应无解体和无着火现象发生。

Date 数据:

No.编号	No disassembly, No fire 无解体、无着火
B9	PASS/合格
B10	PASS/合格
B11	PASS/合格
B12	PASS/合格
B13	PASS/合格
B14	PASS/合格
B15	PASS/合格
B16	PASS/合格

Test T.8: Forced discharge (for cell) 强制放电

Test procedure 测试程序：

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.

The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

20±5℃的环境温度下，将电池连接在12V的直流电源上进行强制放电，此直流电源提供给每个电芯初始电流为制造厂指定的最大放电电流。

对于指定的放电电流则需要和测试电芯串联一个匹配的电阻器，每一个电芯的强制放电时间等于额容量除以初始的测试电流。

Requirement 要求：

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

试验样品在试验中和试验后7天内，应无解体和无着火现象发生。

Date 数据：

No.编号	No disassembly and no fire无解体、无着火
C6	PASS/合格
C7	PASS/合格
C8	PASS/合格
C9	PASS/合格
C10	PASS/合格
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
C21	PASS/合格
C22	PASS/合格
C23	PASS/合格
C24	PASS/合格
C25	PASS/合格

***** End of report*****