

DGR battery information related to Sentry & Sentinel

Sentry 500

The Sentry 500S holds a BP Swing 5300 Li Ion with a capacity of 5.3 Ah.

The amount of lithium in the battery is 1.60 grams.

The UN 38.3 Test report is attached as *Attachment 1 – Sentry 500 UN 38.3*

UN3481-PI967 in IATA DGR 2020 61st edition apply.

Sentinel 100L

The Sentinel 100L uses two Lithium Thionyl Chloride ER 10450 batteries with a capacity of 3.6V each.

The amount of lithium in each battery is 0.48 grams

The UN 38.3 Test report is attached as *Attachment 2 – Sentinel 100 L UN 38.3*

UN3091-PI970 Section II (Batteries, contained in equipment) in IATA DGR 2020 61st edition apply.

Sentinel 100B

The Sentinel 100B does not hold any battery and no DGR apply.



**Inventus Power, Inc. -Technical Center
Safety Laboratory**

5th Floor Western, Changhua Building No.921 Xingye Road,
Nancun Town, Panyu, Guangzhou City, Guangdong 511442,
P.R.China

UN38.3 Test Report

**Tested According to UN Manual of Tests and Criteria, Part
III, subsection 38.3, Rev 6**

Name of Sample: Lithium-Ion Rechargeable Battery

Pack Model/Type: ONASSET

Pack Manufacturer: Inventus Power, Inc.

Cell Model/Type: Boston-Power # Swing 5300

Rated Capacity: 5300mAh

Report No.: TR-DCAL-10-8051

Applicant: Inventus Power, Inc.-Technical Center

Total Pages: 13

All applicable tests according to the above standard(s) have been carried out.

Test results are valid only for the tested samples.

This Test Report can be reproduced only in whole.

General Information

Sample Name	Lithium-Ion Rechargeable Battery		
Model/Type	ONASSET		
Applicant	Inventus Power, Inc.-Technical Center		
Manufacturer	Inventus Power, Inc.		
Factory	ICC Electronics (Dongguan) Ltd.		
Project Number	8051	Receive Date	2019/06/17
Sample Number	8051-1-01~43	Structure	1 S 1 P
Test place	5th Floor Western, Changhua Building No.921 Xingye Road, Nancun Town, Panyu, Guangzhou City, Guangdong 511442, P.R.China		
Test Standard	ST/SG/AC.10/11/Rev.6/Section 38.3		
Test Date	2019/06/17~2019/07/03		
Conclusion	Pass		
Remark	/		

Tested By: *Freed Li*

Approved By: *Lanbi Liu*

Date: 2019/07/04

Date: 2019/07/04

Summary of UN38.3 Test

No.	Test Item	Description	Results	Note
T1	Altitude Simulation	simulate air transport under low-pressure conditions.	Pass	/
T2	Thermal Test	assess battery seal integrity and internal electrical connections.	Pass	/
T3	Vibration	simulate vibration during transport.	Pass	/
T4	Shock	simulate possible impacts during transport.	Pass	/
T5	External Short Circuit	simulate an external short circuit.	Pass	/
T6	Impact/Crush	simulate an impact/simulate a crush	Pass	/
T7	Overcharge	evaluate the ability of a rechargeable battery to withstand an overcharge condition.	Pass	/
T8	Forced Discharge	evaluate the ability of a primary or a rechargeable cell to withstand a forced discharge condition	Pass	/
Description of the sampling procedure		/		
Description of the deviation from the standard, if any		/		
Overall status		/		

TEST EQUIPMENT INFORMATION

Equipment Name	Model Name	Instr. Code	Last Cal. Date	Next Cal. Date
Vacuum Box	T-TRD-C-36	55	2018/11/30	2019/11/29
Thermotron thermal shock equipment	J-MTCT-30-CF	166	2018/11/30	2019/11/29
Vibration Test Bench	DC-300-3	99	2019/02/19	2020/02/18
Impact Test Bench	CL-20/KCL-2000	98	2018/11/30	2019/11/29
Constant Temp& Hum Box	EW0240	96	2018/11/30	2019/11/29
Battery Acupuncture and Extruder Tester	HY-ZCJY-01A	109	2019/04/02	2020/04/01
Explosion Proof Box	BE-001-1	126	--	--
Electrical Scale	YHC	167	2019/06/11	2020/06/10
Digital Multimeter	34401A	04	2018/11/30	2019/11/29
DC low resistance tester	JK2511	66	2018/11/30	2019/11/29
Data Acquisition	34970A	142	2018/11/30	2019/11/29
Data Acquisition Card	34901A	143	2018/11/30	2019/11/29
DC Source	PAT60-67T	113	2018/11/30	2019/11/29
DC Source	PAT60-67T	114	2018/11/30	2019/11/29
DC Source	PAT60-67T	118	2018/11/30	2019/11/29
DC Source	PAT60-67T	119	2018/11/30	2019/11/29
E-load	PLZ164W	157	2018/11/30	2019/11/29
/				

T1: Altitude Simulation

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: The batteries shall be stored at a pressure of 11.6Kpa or less for at least 6 hours at ambient temperature (20±5°C). Each battery was inspected for leak of electrolyte.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Mass	Voltage	Mass	Mass loss	Voltage	Voltage percentage(%)
	(g)	(V)	(g)	(%)	(V)	not less than 90%
8051-1-01	97.526	4.181	97.521	0.01	4.180	99.98
8051-1-02	97.283	4.195	97.280	0.00	4.194	99.98
8051-1-03	97.114	4.174	97.109	0.01	4.172	99.95
8051-1-04	97.842	4.178	97.836	0.01	4.177	99.98
8051-1-05	97.035	4.182	97.032	0.00	4.181	99.98
8051-1-06	97.630	4.178	97.623	0.01	4.177	99.98
8051-1-07	97.288	4.162	97.283	0.01	4.161	99.98
8051-1-08	96.575	4.186	96.572	0.00	4.186	100.00
8051-1-09	97.563	4.182	97.558	0.01	4.181	99.98
8051-1-10	97.462	4.179	97.459	0.00	4.177	99.95
Leakage (Yes/No)			No			
Venting (Yes/No)			No			
Disassembly (Yes/No)			No			
Rupture (Yes/No)			No			
Fire (Yes/No)			No			
Result			Pass			

T2: Thermal Test

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: Batteries are subjected to thermal shock of $-40\pm 2^{\circ}\text{C}/72\pm 2^{\circ}\text{C}$, 6hours dwell in each temperature, total of 10 cycles. The maximum time interval between test temperature extremes is 30minutes.

Each battery was then stored for 24hours at ambient temperature ($20\pm 5^{\circ}\text{C}$) before final inspection for leakage of electrolyte, mass and OCV was measured.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Mass	Voltage	Mass	Mass loss	Voltage	Voltage percentage(%)
	(g)	(V)	(g)	(%)	(V)	not less than 90%
8051-1-01	97.521	4.180	97.496	0.03	4.105	98.21
8051-1-02	97.280	4.194	97.243	0.04	4.107	97.93
8051-1-03	97.109	4.172	97.075	0.04	4.089	98.01
8051-1-04	97.836	4.177	97.793	0.04	4.094	98.01
8051-1-05	97.032	4.181	96.987	0.05	4.127	98.71
8051-1-06	97.623	4.177	97.592	0.03	4.102	98.20
8051-1-07	97.283	4.161	97.251	0.03	4.099	98.51
8051-1-08	96.572	4.186	96.543	0.03	4.132	98.71
8051-1-09	97.558	4.181	97.504	0.06	4.117	98.47
8051-1-10	97.459	4.177	97.429	0.03	4.125	98.76
Leakage (Yes/No)			No			
Venting (Yes/No)			No			
Disassembly (Yes/No)			No			
Rupture (Yes/No)			No			
Fire (Yes/No)			No			
Result			Pass			

T3: Vibration

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: The vibration shall be a sinusoidal waveform with a logarithmic sweep 7-200-7Hz in 15 minutes, 3 hours for each of three mutually perpendicular mounting positions of the batteries.

The logarithmic frequency sweep is as follows: from 7Hz a peak acceleration of 1g is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8g occurs (approximately 50Hz). A peak acceleration of 8g is then maintained until the frequency is increased to 200Hz.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Mass	Voltage	Mass	Mass loss	Voltage	Voltage percentage(%)
	(g)	(V)	(g)	(%)	(V)	not less than 90%
8051-1-01	97.496	4.105	97.491	0.01	4.101	99.90
8051-1-02	97.243	4.107	97.240	0.00	4.105	99.95
8051-1-03	97.075	4.089	97.071	0.00	4.083	99.85
8051-1-04	97.793	4.094	97.787	0.01	4.091	99.93
8051-1-05	96.987	4.127	96.980	0.01	4.124	99.93
8051-1-06	97.592	4.102	97.589	0.00	4.097	99.88
8051-1-07	97.251	4.099	97.243	0.01	4.093	99.85
8051-1-08	96.543	4.132	96.534	0.01	4.126	99.85
8051-1-09	97.504	4.117	97.500	0.00	4.113	99.90
8051-1-10	97.429	4.125	97.425	0.00	4.121	99.90
Leakage (Yes/No)			No			
Venting (Yes/No)			No			
Disassembly (Yes/No)			No			
Rupture (Yes/No)			No			
Fire (Yes/No)			No			
Result			Pass			

T4: Shock

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: The shock shall be a half-sine shock of peak acceleration of 150g for 6ms. Battery shall be subjected to 3 shocks in the positive direction followed by 3 shocks in the negative direction of 3 mutually perpendicular mounting position.

Total of 18 shocks.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Mass	Voltage	Mass	Mass loss	Voltage	Voltage percentage(%)
	(g)	(V)	(g)	(%)	(V)	not less than 90%
8051-1-01	97.491	4.101	97.491	0.00	4.099	99.95
8051-1-02	97.240	4.105	97.238	0.00	4.104	99.98
8051-1-03	97.071	4.083	97.070	0.00	4.080	99.93
8051-1-04	97.787	4.091	97.784	0.00	4.088	99.93
8051-1-05	96.980	4.124	96.977	0.00	4.123	99.98
8051-1-06	97.589	4.097	97.588	0.00	4.097	100.00
8051-1-07	97.243	4.093	97.243	0.00	4.092	99.98
8051-1-08	96.534	4.126	96.532	0.00	4.123	99.93
8051-1-09	97.500	4.113	97.497	0.00	4.112	99.98
8051-1-10	97.425	4.121	97.424	0.00	4.120	99.98
Leakage (Yes/No)			No			
Venting (Yes/No)			No			
Disassembly (Yes/No)			No			
Rupture (Yes/No)			No			
Fire (Yes/No)			No			
Result			Pass			

T5: External short circuit

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: The battery to be tested shall be temperature stabilized so that its external case temperature reaches $57\pm 4^{\circ}\text{C}$ and then the battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at $57\pm 4^{\circ}\text{C}$. This short circuit condition is continued for at least one hour after the battery external case temperature has returned to $57\pm 4^{\circ}\text{C}$. The battery must be observed for a further 6 hours for the test to be concluded.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Sample condition	Voltage	Maximum external temperature($^{\circ}\text{C}$)	Disassembly	Rupture	Fire
		(V)	less than 170°C	(Yes/No)	(Yes/No)	(Yes/No)
8051-1-01	at first cycle, in fully charged states	4.099	56.31	No	No	No
8051-1-02		4.104	56.00	No	No	No
8051-1-03		4.080	56.25	No	No	No
8051-1-04		4.088	56.22	No	No	No
8051-1-05		4.123	56.33	No	No	No
8051-1-06		4.097	56.65	No	No	No
8051-1-07		4.092	56.38	No	No	No
8051-1-08		4.123	56.40	No	No	No
8051-1-09		4.112	56.49	No	No	No
8051-1-10		4.120	56.03	No	No	No
Result			Pass			

T6: Impact / Crush

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Impact Method: This test sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm diameter bar is to be placed across the center of the sample. A 9.1kg mass is to be dropped from a height of 61 ± 2.5 cm onto the sample. The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the $15.8 \text{ mm} \pm 0.1 \text{ mm}$ diameter curved surface lying across the center of the test sample. Each sample is to be subjected to only a single impact. Cells external temperature not exceed 170°C .

No disassembly, no fire within six hours of this test.

Crush Method: 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.

The applied force reaches $13 \text{ kN} \pm 0.78 \text{ kN}$.

The voltage of the cell drops by at least 100 mV.

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

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. Each sample external temperature do not exceed 170°C .

No disassembly, no fire within six hours of this test.

Chose Method for this test: Crush

Charge Method: 3700 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		After test			
	Sample condition	Voltage	Maximum external temperature($^\circ\text{C}$)	Disassembly	Fire	Result
		(V)	less than 170°C	(Yes/No)	(Yes/No)	(pass/fail)
8051-1-19	first cycle	3.834	31.72	No	No	Pass
8051-1-20	at 50% of	3.835	103.05	No	No	Pass
8051-1-21	the design	3.835	31.67	No	No	Pass
8051-1-22	rated	3.836	31.46	No	No	Pass
8051-1-23	capacity	3.835	32.62	No	No	Pass

T7: Overcharge

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: The charge current shall be twice the manufacture's recommended maximum continuous charge current. The minimum voltage of the test shall be 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.

Charge Method: 1500 mA @ CV= 4.2 V up to 50 mA cutoff

Discharge Method: 1040 mA up to 2.75 V

Result:

Sample No.	Before test		Test condition	
	Sample condition	Voltage (V)	Voltage (V)	Current (A)
8051-1-11	at first cycle, in fully charged states	4.174	8.4	3
8051-1-12		4.189		
8051-1-13		4.177		
8051-1-14		4.173		
8051-1-15	after 50 cycles ending in fully charged states	4.179		
8051-1-16		4.182		
8051-1-17		4.185		
8051-1-18		4.178		
Battery Status within 7 days of the test	Disassembly (Yes/No)		No	
	Fire (Yes/No)		No	
Result	Pass			

T8: Forced Discharge

Pack Model: ONASSET

Cell Model: Boston-Power # Swing 5300

Method: Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 Vdc. 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).

Test Voltage: 12 V

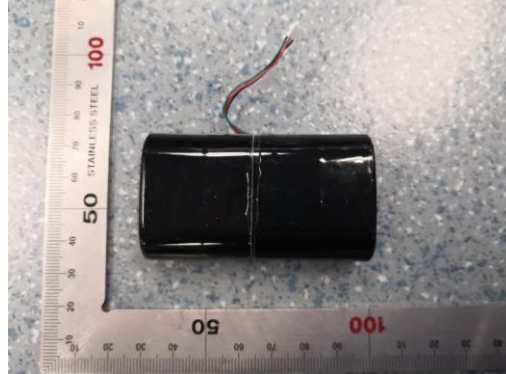
Test Current: 13 A

Result:

Sample No.	Before test		After test		
	Sample condition	Voltage (V)	Disassembly (Yes/No)	Fire (Yes/No)	Result (pass/fail)
8051-1-24	at first cycle in fully discharged	2.887	No	No	Pass
8051-1-25		2.913	No	No	Pass
8051-1-26		2.896	No	No	Pass
8051-1-27		2.930	No	No	Pass
8051-1-28		2.910	No	No	Pass
8051-1-29		2.873	No	No	Pass
8051-1-30		2.881	No	No	Pass
8051-1-31		2.914	No	No	Pass
8051-1-32		2.920	No	No	Pass
8051-1-33		2.895	No	No	Pass
8051-1-34	after 50 cycle ending in fully discharged	2.851	No	No	Pass
8051-1-35		2.894	No	No	Pass
8051-1-36		2.910	No	No	Pass
8051-1-37		2.878	No	No	Pass
8051-1-38		2.921	No	No	Pass
8051-1-39		2.907	No	No	Pass
8051-1-40		2.892	No	No	Pass
8051-1-41		2.867	No	No	Pass
8051-1-42		2.913	No	No	Pass
8051-1-43		2.919	No	No	Pass

Sample Picture

Pack Model: ONASSET
Cell Model: Boston-Power # Swing 5300



End Report

UN38.3 检测报告

UN38.3 Test Report

Client 委托方	SHENZHEN PKCELL BATTERY CO., LTD. 深圳市比苛电池有限公司
Add. of Client 委托方地址	2nd Floor, 4th Building, Meitai Technology Park, No.1231, Guanguang Road, Osmanthus Community, Guanlan Town, Longhua New Area, Shenzhen 深圳市龙华新区观澜街道桂花社区观光路 1231 号美泰科技园肆号厂房贰楼
Samples Description 样品名称	Primary Lithium Battery 一次锂电池
Model/Type 型号规格	ER10450
Testing Laboratory 测试机构	Shenzhen NCT Testing Technology Co., Ltd. 深圳诺测检测技术有限公司 1 / F, No. B Building, Mianshang Younger Pioneer Park, Hangcheng Road, Gushu Xixiang Street, Baoan District, Shenzhen, Guangdong, China 中国广东省深圳市宝安区西乡街道固戍航城大道绵商青年创业园 B 栋第 1 层 Phone number 电话号码: +86-755-27790922 Email 邮箱: sales@nct-testing.com Website 网址: http://www.nct-testing.cn
Report No. 报告编号	NCT19047302XB1-1
Issued Date 发行日期	Nov. 25, 2019
Test Conclusion 测试结论: Shown in the Conclusion of test report. 见检测报告结论页.	

Tested by 主检人: Pingbin

Approved by 批准人

Inspected by 审核人: Hely Wang

Seal of NCT 报告单位 (盖章)

Date of Issue 签发日期: 2019. 11. 25



I、Sample Description 样品描述

Product Name 产品名称	Primary Lithium Battery 一次锂电池		Sample Model 样品型号	ER10450	
Manufacturer 制造商	SHENZHEN PKCELL BATTERY CO., LTD. 深圳市比苛电池有限公司				
Address 地址	2nd Floor, 4th Building, Meitai Technology Park, No.1231, Guanguang Road, Osmanthus Community, Guanlan Town, Longhua New Area, Shenzhen 深圳市龙华新区观澜街道桂花社区观光路 1231 号美泰科技园肆号厂房贰楼				
Factory 工厂	SHENZHEN PKCELL BATTERY CO., LTD. 深圳市比苛电池有限公司				
Address 地址	2nd Floor, 4th Building, Meitai Technology Park, No.1231, Guanguang Road, Osmanthus Community, Guanlan Town, Longhua New Area, Shenzhen 深圳市龙华新区观澜街道桂花社区观光路 1231 号美泰科技园肆号厂房贰楼				
Manufacturer's contact information 制造商联系信息	Phone number 电话号码		Email address 电子邮箱地址		Website 网址
	+86-13727580105		3004814533@qq.com		---
Trade Mark 商标	---	Cell Shape 电芯形状	Cylindrical 圆柱形	Battery Size 电池尺寸 (L×W×T)Max	(47.5×21.5×11.0)mm
Nominal Voltage 标称电压	3.6V	Rated Capacity 额定容量	1600mAh	Lithium content 锂含量	0.48g
Standard Charge Current 标准充电电流	--	Maximum Continuous Charge Current 最大持续充电电流	--	End Charge Current 结束充电电流	--
Cut-off Voltage 放电截止电压	2.0V	Standard Discharge Current 标准放电电流	1.0mA	Maximum Discharge Current 最大放电电流	50mA
Cells Number 组成电芯数量	2PCS		Cell Model 电芯型号	ER10450 800mAh 3.6V	
Sample Mass 样品重量	19.2g		Sample Physical description 样品物理形态	Blue, Prismatic, Solid 蓝色, 棱柱形, 固体	
Receiving Date 接收日期	Nov. 08, 2019		Completing Date 完成日期	Nov. 22, 2019	

II、Standard 标准

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

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

III、Test Item 测试项目

- | | |
|---|--|
| T.1. <input checked="" type="checkbox"/> Altitude simulation 高度模拟 | T.5. <input checked="" type="checkbox"/> External short circuit 外部短路 |
| T.2. <input checked="" type="checkbox"/> Thermal test 温度试验 | T.6. <input type="checkbox"/> Impact / <input checked="" type="checkbox"/> Crush 撞击/挤压 |
| T.3. <input checked="" type="checkbox"/> Vibration 振动 | T.7. <input type="checkbox"/> Overcharge 过充电 |
| T.4. <input checked="" type="checkbox"/> Shock 冲击 | T.8. <input checked="" type="checkbox"/> Forced discharge 强制放电 |

IV、Test Method and Requirement 测试方法和要求

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

用相同的电芯或电池按照顺序进行试验 T.1 至 T.5。试验 T.6 至 T.8 用没有进行其他试验的电芯。试验 T7 可以使用原先在试验 T1 至 T5 中使用过的未损坏的电池进行，以便测试交替充电放电的电池。

Batteries of B1#~B4# are in undischarged states;

Batteries of B5#~B8# are in fully discharged states;

Cells of C1#~C5# are in undischarged states;

Cells of C6#~C10# are in fully discharged states;

Cells of C11#~C20# are in fully discharged states;

Test environment condition: ambient temperature: 15-25°C, ambient humidity: 40-70%.

电池 B1#~B4#为四个未放电状态的电池；

电池 B5#~B8#为四个完全放电状态的电池；

电芯 C1#~C5#为五个未放电状态的电芯；

电芯 C6#~C10#为五个完全放电状态的电芯；

电芯 C11#~C20#为十个完全放电状态的电芯；

试验环境条件：环境温度：15-25°C，环境湿度：40-70%。

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

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

质量损失的量化值，可用以下公式计算：

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

Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the values in Table below, it shall be considered as "no mass loss".

式中：M1 是试验前的质量，M2 是试验后的质量。如果质量损失不超过下表所列的数值，应视为“无质量损失”。

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

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

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

In test T.1 to T.4, cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

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

T.1. Altitude simulation 高度模拟

Test method 测试方法

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

试验电芯和电池被放置在压力等于或低于 11.6 kPa 和环境温度(20±5°C)下存放至少 6 小时。

Requirement 要求

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

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%。

T.2. Thermal test 温度试验

Test method 测试方法

Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2°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.

试验电芯和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 次循环，接着将所有试验电芯和电池在环境温度(20±5°C)下存放 24 小时。对于大型电芯和电池，暴露于极端试验温度的时间至少应为 12 小时。

Requirement 要求

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

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电

压不小于其在进行这一试验前电压的 90%。

T.3. Vibration 振动

Test method 测试方法

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

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

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

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

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

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

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

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

Requirement 要求

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

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%。

T.4. Shock 冲击

Test method 测试方法

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

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

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

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

Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries.

The formulas below are provided to calculate the appropriate minimum peak accelerations.

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

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g _n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ whichever is smaller	6 ms
Large batteries	50 g _n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass^*}\right)}$ whichever is smaller	11 ms

* Mass is expressed in kilograms.

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

Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

每个电芯或电池须在三个互相垂直的电芯或电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。

Requirement 要求

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

电芯和电池须无渗漏、无泄气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%。

T.5. External short circuit 外部短路

Test method 测试方法

The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57±4°C, 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°C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.

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

This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57\pm 4^{\circ}\text{C}$, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.

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

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

短路测试和冷却阶段至少应该在环境温度下进行。

Requirement 要求

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

电芯和电池外壳温度不超过 170°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。

T.6. Impact / Crush 撞击/挤压

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

测试步骤 – 撞击（适用于直径大于等于 18.0 毫米以上的圆柱形电芯）

The test sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm \pm 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 \pm 0.1 kg mass is to be dropped from a height of 61 \pm 2.5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.

试样电芯或电芯组件放在平坦光滑表面上，一根 316 型不锈钢棒横放在试样中心，钢棒直径 15.8 毫米 \pm 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 \pm 0.1 千克的重锤从 61 \pm 2.5 厘米高度跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿与水平支撑表面呈 90 度落下。

The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm \pm 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

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

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

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

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

将电芯或电芯组件放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为 1.5 cm/s。挤压持续进行，直到出现以下三种情况之一：

- (a) The applied force reaches 13 kN \pm 0.78 kN;
- (b) The voltage of the cell drops by at least 100 mV;
- (c) The cell is deformed by 50% or more of its original thickness.
- (a)施加的力达到 13 kN \pm 0.78 kN;
- (b)电芯的电压下降至少 100mV;
- (c)电芯形变达到原始厚度的 50%或更多。

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

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

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell

shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

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

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

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

Requirement 要求

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

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

T.7. Overcharge 过充电

Test method 测试方法

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

充电电流为制造商推荐的最大持续充电电流的两倍。试验的最小电压如下：

- (a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.
 - (b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.
- (a) 制造商推荐的充电电压不大于 18 伏时，试验的最小电压应是电池最大充电电压的两倍或 22 伏两者中的较小者。
- (b) 制造商推荐的充电电压大于 18 伏时，试验的最小电压应是电池最大充电电压的 1.2 倍。

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

试验应在环境温度下进行。进行试验的时间应为 24 小时。

Requirement 要求

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

充电电池应在试验过程中和试验后 7 天内无解体，无起火。

T.8. Forced discharge 强制放电

Test method 测试方法

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

每个电芯在环境温度下与 12V 直流电源串联在起始电流等于制造商给定的最大放电电流的条件下强制放电。

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

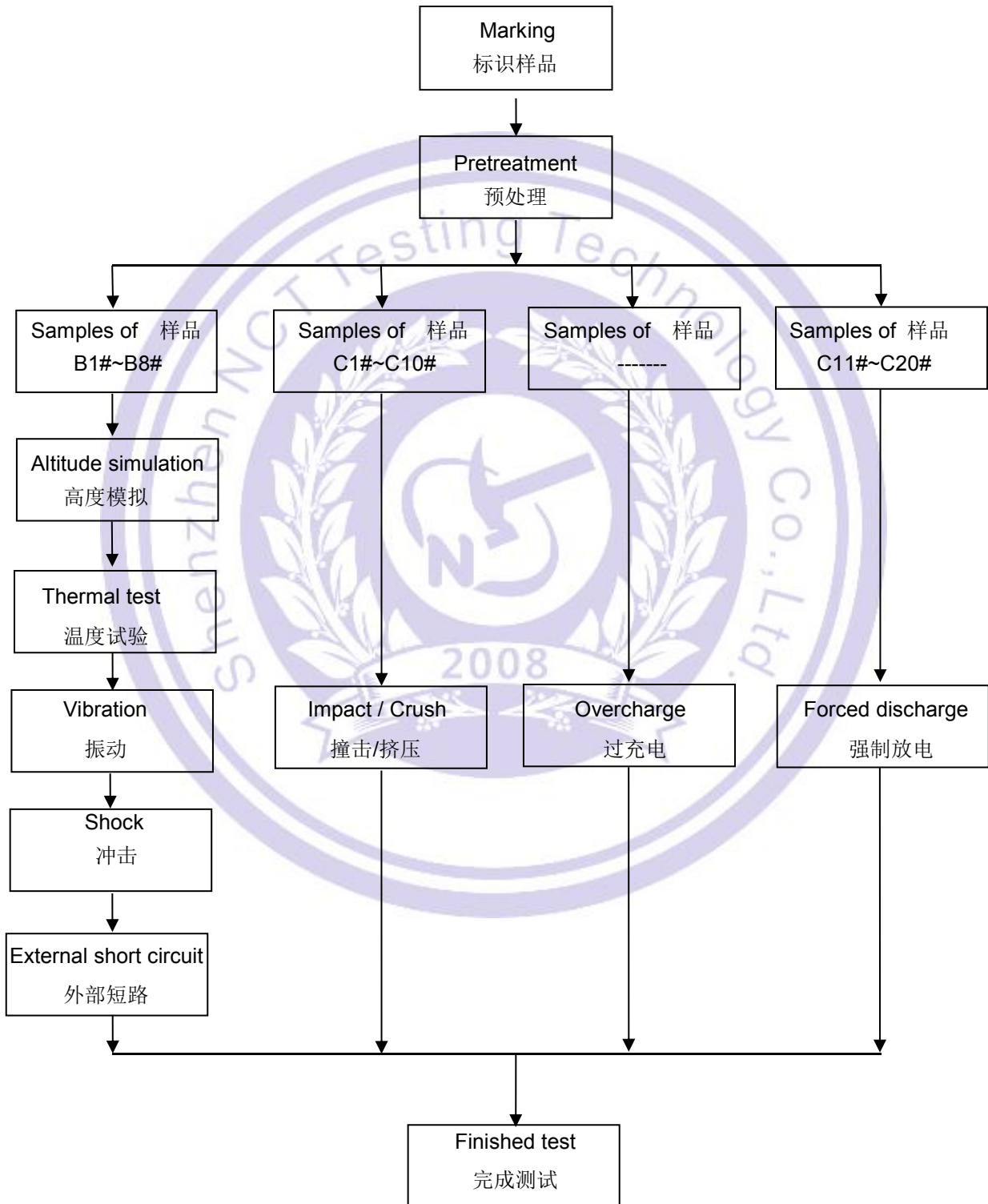
试样电芯与一个适当大小的电阻负载串联以调节到规定大小的放电电流。每个电芯的放电时间(单位为 h)等于电芯的额定容量除以试验初始放电电流(单位 A)。

Requirement 要求

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

原电芯或充电电芯应在试验过程中和试验后 7 天内无解体，无起火。

V、Test Procedure 测试流程



VI、Main Test Apparatus 主要测试仪器

Serial No. 设备编号	Name of Equipment 设备名称	Model 型号	Calibration Date /Due Date 校准日期/到期日
NCT-030	Charge and discharge testing system 充放电测试系统	R2D6-5V-5A	2019. 01. 11
			2020. 01. 10
NCT-012	Low-pressure high-altitude simulation test chamber 低压高空模拟试验箱	GX-3020-Z	2019. 01. 11
			2020. 01. 10
NCT-017	Constant temperature and humidity test chamber 恒温恒湿试验箱	GX-3000-150LT	2019. 01. 11
			2020. 01. 10
NCT-021	Vibration test instrument 振动测试仪器	ES-3-150	2019. 01. 11
			2020. 01. 10
NCT-022	Shock test instrument 冲击测试仪器	SY10-2	2019. 06. 28
			2020. 06. 27
NCT-018	Battery short circuit test instrument 电池短路测试仪器	BE-1000W	2019. 01. 11
			2020. 01. 10
NCT-020	Crush test instrument 挤压测试仪器	BE-6045T	2019. 06. 28
			2020. 06. 27
NCT-026	Electronic Load 电子负载	8511	2019. 01. 11
			2020. 01. 10
NCT-033	DC regulated power supply 直流稳压电源	PS1540	2019. 01. 11
			2020. 01. 10
NCT-016	Battery anti-explosion chamber 电池防爆箱	GX-FB-200	--
			--
NCT-003	Electronic Scale 电子秤	JC-223S	2019. 01. 11
			2020. 01. 10
NCT-001	Digital Multimeter 数字万用表	17B+	2019. 01. 11
			2020. 01. 10
NCT-029	Temperature recorder 温度记录仪	34970A	2019. 01. 11
			2020. 01. 10

VII、Test Data 测试数据

T.1. Altitude simulation 高度模拟

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
undischarged state 未放电状态	B1#	19.138	3.666	19.137	3.665	0.005	99.973	Pass 合格
	B2#	19.213	3.664	19.213	3.663	0.000	99.973	Pass 合格
	B3#	19.244	3.663	19.243	3.662	0.005	99.973	Pass 合格
	B4#	19.181	3.668	19.181	3.668	0.000	100.000	Pass 合格
full discharged state 完全放电状态	B5#	19.209	--	19.208	--	0.005	--	Pass 合格
	B6#	19.082	--	19.081	--	0.005	--	Pass 合格
	B7#	19.112	--	19.112	--	0.000	--	Pass 合格
	B8#	19.008	--	19.007	--	0.005	--	Pass 合格

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

T.2. Thermal test 温度试验

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
undischarged state 未放电状态	B1#	19.137	3.665	19.135	3.664	0.010	99.973	Pass 合格
	B2#	19.213	3.663	19.212	3.662	0.005	99.973	Pass 合格
	B3#	19.243	3.662	19.242	3.660	0.005	99.945	Pass 合格
	B4#	19.181	3.668	19.179	3.667	0.010	99.973	Pass 合格
full discharged state 完全放电状态	B5#	19.208	--	19.207	--	0.005	--	Pass 合格
	B6#	19.081	--	19.079	--	0.010	--	Pass 合格
	B7#	19.112	--	19.111	--	0.005	--	Pass 合格
	B8#	19.007	--	19.005	--	0.011	--	Pass 合格

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

T.3. Vibration 振动

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
undischarged state 未放电状态	B1#	19.135	3.664	19.134	3.663	0.005	99.973	Pass 合格
	B2#	19.212	3.662	19.212	3.662	0.000	100.000	Pass 合格
	B3#	19.242	3.660	19.241	3.659	0.005	99.973	Pass 合格
	B4#	19.179	3.667	19.178	3.665	0.005	99.945	Pass 合格
full discharged state 完全放电状态	B5#	19.207	--	19.207	--	0.000	--	Pass 合格
	B6#	19.079	--	19.078	--	0.005	--	Pass 合格
	B7#	19.111	--	19.111	--	0.000	--	Pass 合格
	B8#	19.005	--	19.004	--	0.005	--	Pass 合格

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

T.4. Shock 冲击

The state of cells 样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
undischarged state 未放电状态	B1#	19.134	3.663	19.133	3.662	0.005	99.973	Pass 合格
	B2#	19.212	3.662	19.211	3.659	0.005	99.918	Pass 合格
	B3#	19.241	3.659	19.241	3.658	0.000	99.973	Pass 合格
	B4#	19.178	3.665	19.177	3.664	0.005	99.973	Pass 合格
full discharged state 完全放电状态	B5#	19.207	--	19.206	--	0.005	--	Pass 合格
	B6#	19.078	--	19.077	--	0.005	--	Pass 合格
	B7#	19.111	--	19.111	--	0.000	--	Pass 合格
	B8#	19.004	--	19.003	--	0.005	--	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.5°C
After the test, there is no leakage, no venting, no disassembly, no rupture and no fire.
测试后, 电池未渗漏、未泄气、未解体、未破裂和未起火。

T.5. External short circuit 外部短路

The state of cells 样品状态	No. 编号	External Peak temperature(°C) 电池表面最高温度(°C)	Status 结果
undischarged state 未放电状态	B1#	57.1	Pass 合格
	B2#	57.3	Pass 合格
	B3#	57.1	Pass 合格
	B4#	58.2	Pass 合格
full discharged state 完全放电状态	B5#	57.8	Pass 合格
	B6#	57.5	Pass 合格
	B7#	57.4	Pass 合格
	B8#	57.7	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.5°C
There is no disassembly, no rupture and no fire within six hours after test.
电池在测试后 6 小时内未解体、未破裂, 未起火。

T.6. Crush 挤压

The state of cells 样品状态	No. 编号	External Peak temperature(°C) 电池表面最高温度(°C)	Status 结果
undischarged state 未放电状态	C1#	23.7	Pass 合格
	C2#	23.7	Pass 合格
	C3#	23.8	Pass 合格
	C4#	24.2	Pass 合格
	C5#	23.8	Pass 合格
full discharged state 完全放电状态	C6#	24.1	Pass 合格
	C7#	24.0	Pass 合格
	C8#	23.8	Pass 合格
	C9#	23.8	Pass 合格
	C10#	23.9	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: 1.013×10^5 Pa, Ambient temperature 环境温度: 23.5°C
There is no disassembly, no rupture and no fire within six hours after test.
电芯在测试后 6 小时内未解体、未破裂, 未起火。

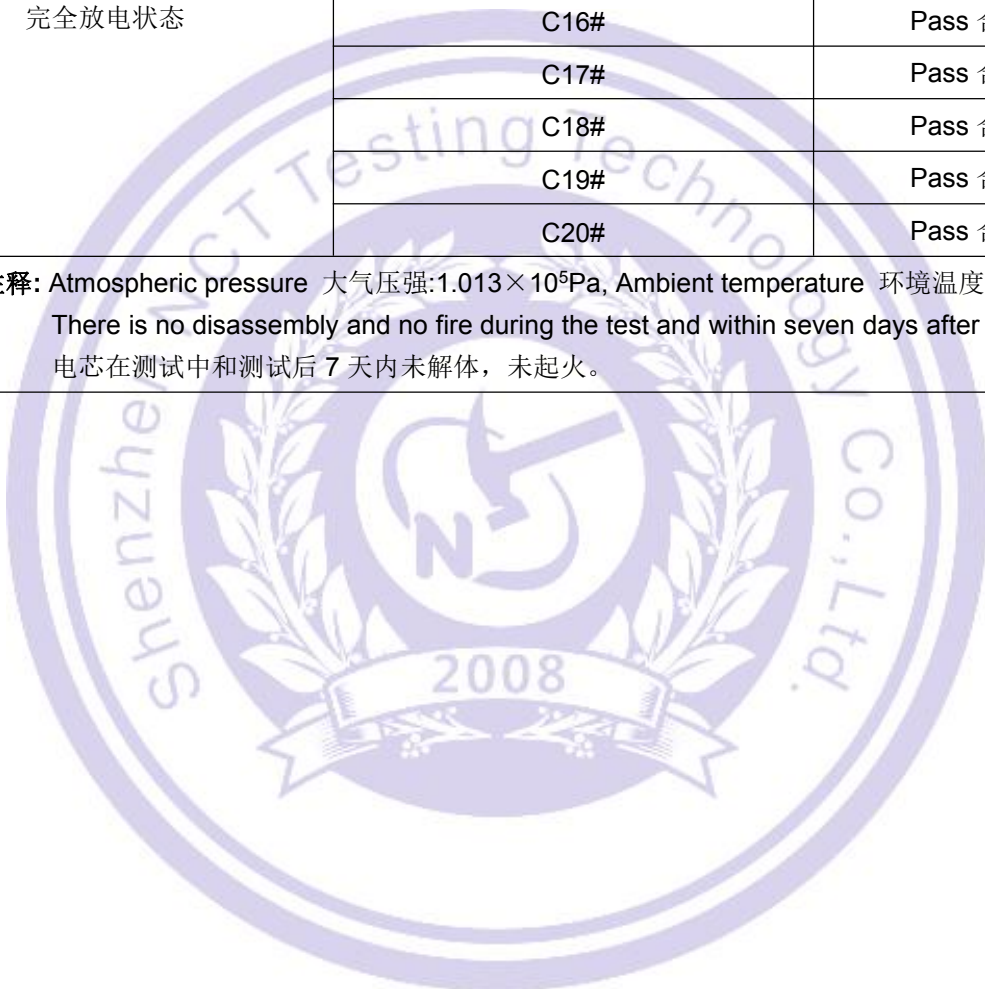
T.7. Overcharge 过充电

(Not Applicable 不适用)

T.8. Forced discharge 强制放电

The state of cells 样品状态	No. 编号	Status 结果
Fully discharged states 完全放电状态	C11#	Pass 合格
	C12#	Pass 合格
	C13#	Pass 合格
	C14#	Pass 合格
	C15#	Pass 合格
	C16#	Pass 合格
	C17#	Pass 合格
	C18#	Pass 合格
	C19#	Pass 合格
	C20#	Pass 合格

Notes 注释: Atmospheric pressure 大气压强: $1.013 \times 10^5 \text{Pa}$, Ambient temperature 环境温度: 23.3°C
 There is no disassembly and no fire during the test and within seven days after the test.
 电芯在测试中和测试后 7 天内未解体, 未起火。



VIII、Conclusion 结论

No. 编号	Test item 测试项目	Sample number 样品数量	Test reference 测试参考	Conclusion 结论
1	Altitude simulation 高度模拟	B1#~B8#	UN Manual of Test and Criteria, part III, subsection 38.3.4.1 UN 试验和标准手册,第III部分,第 38.3.4.1 节	Pass 合格
2	Thermal test 温度试验		UN Manual of Test and Criteria, part III, subsection 38.3.4.2 UN 试验和标准手册,第III部分,第 38.3.4.2 节	Pass 合格
3	Vibration 振动		UN Manual of Test and Criteria, part III, subsection 38.3.4.3 UN 试验和标准手册,第III部分,第 38.3.4.3 节	Pass 合格
4	Shock 冲击		UN Manual of Test and Criteria, part III, subsection 38.3.4.4 UN 试验和标准手册,第III部分,第 38.3.4.4 节	Pass 合格
5	External short circuit 外部短路		UN Manual of Test and Criteria, part III, subsection 38.3.4.5 UN 试验和标准手册,第III部分,第 38.3.4.5 节	Pass 合格
6	Impact/Crush 撞击/挤压	C1#~C10#	UN Manual of Test and Criteria, part III, subsection 38.3.4.6 UN 试验和标准手册,第III部分,第 38.3.4.6 节	Pass 合格
7	Overcharge 过度充电	----	UN Manual of Test and Criteria, part III, subsection 38.3.4.7 UN 试验和标准手册,第III部分,第 38.3.4.7 节	Not Applicable 不适用
8	Forced discharge 强制放电	C11#~C20#	UN Manual of Test and Criteria, part III, subsection 38.3.4.8 UN 试验和标准手册,第III部分,第 38.3.4.8 节	Pass 合格

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

经检测，提交的测试样品均符合 UN38.3 的要求，测试结论为合格。

IX、Photo of The Sample 样品图片

Model 型号: ER10450



Photo 1 Front 正面

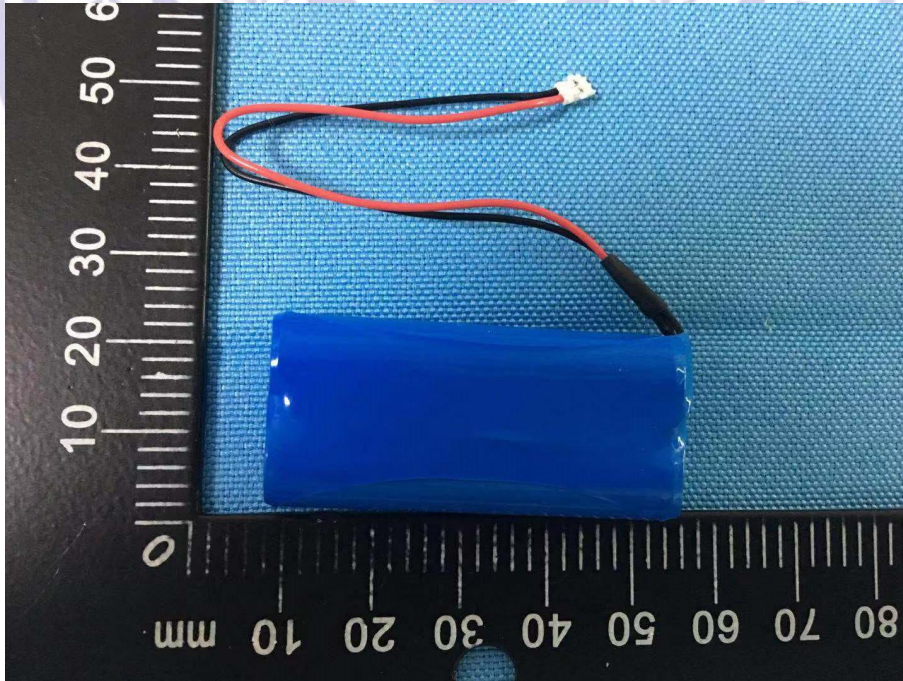


Photo 2 Rear 反面



Photo 3 Internal Cell 内部电芯

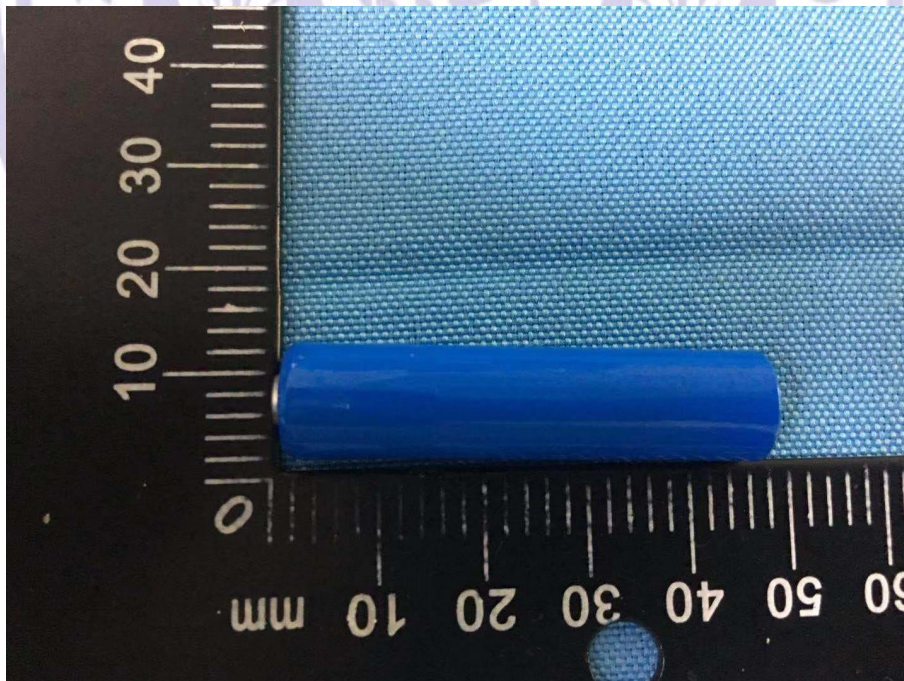


Photo 4 Internal Cell 内部电芯

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