

锂电池 UN38.3 测试报告

Lithium Battery UN38.3 Test Report

Sample Name Li-ion Battery PR-474446

Client TCL Hyperpower Batteries Inc.

Manufacturer TCL Hyperpower Batteries Inc.

P O N Y 谱 尼 测 试
Pony Testing International Group

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I、SAMPLE DESCRIPTION

Sample Name	Li-ion Battery	Battery Type	PR-474446		
Client	TCL Hyperpower Batteries Inc.				
Manufacturer	TCL Hyperpower Batteries Inc.				
Nominal Voltage	3.7V	Rated Capacity	1050mAh	Limited Charge Voltage	4.2V
Charge Current	525mA	Maximum Continuous Charge Current	1050mA	End Charge Current	11mA
Cut-off Voltage	3V	Maximum Discharge Current	1050mA	Use	MID
Cells Number	1PCS	Cell Model	474446	Rated Capacity	1050mAh
Manufacturer of cell	TCL Hyperpower Batteries Inc.				
Chemical component	LiCoO ₂ 35%, C12%, LiPF ₆ 15%				
Client date	2011-07-02	Finished date	2011-07-21		

II、STANDARD

Recommendations on transport of dangerous goods, manual of test and criteria, section 38.3 lithium batteries.

III、TEST ITEM

- | | |
|------------------------|--------------------------------|
| 1. Altitude simulation | 5. External short circuit |
| 2. Thermal test | 6. Impact (for component cell) |
| 3. Vibration | 7. Overcharge |
| 4. Shock | 8. Forced discharge (for cell) |

IV、CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation	N1~N4 C1~C4	UN38.3	PASS
Thermal test			PASS
Vibration			PASS
Shock			PASS
External short circuit			PASS
Impact (for component cell)	N9~N18		PASS
Overcharge	N5~N8 C5~C8		PASS
Forced discharge(for cell)	---		N/A (Not applicable)

The submitted battery and component cell were complied with the stated requirements of UN38.3.

Edited by: *Yang Jinghua* Checked by: *[Signature]* Approved by: *[Signature]*
Approval Date: July 21, 2011

Notes:

Batteries of N1~N8 are full charged after one cycle;

Component cells of N9~N18 are 50% charged after one cycle;

Batteries of C1~C8 are full charged after fifty cycles.

V、 PHOTO OF THE SAMPLE

Authenticate the photo on original report only

VI、 TEST METHOD

Test 1 to 5 must be conducted in sequence on the same battery.

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

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

Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the value in table blow, it shall be considered as “no mass loss”.

Mass M of cell or battery	Mass loss limit
M < 1g	0.5%
1g < M < 5g	0.2%
M ≥ 5g	0.1%

In test 1 to 4, cells and batteries meet this requirement if there is no mass loss, 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.

1. Altitude simulation

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

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 10 times, after which all cells and batteries are to be stored for 24 hours at ambient temperature(20±5°C). For large cell and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

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 15minutes. 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 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 occurs (approximately 50 Hz). A peak acceleration of 8 g is then maintained until the frequency is increased to 200 Hz.

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 or battery shall be subjected to a half-sine shock of peak acceleration of 150 g 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.

5. External short circuit

The cell and battery to be tested shall be temperature stabilized so that its external case temperature reaches $55\pm 2^{\circ}\text{C}$ 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 $55\pm 2^{\circ}\text{C}$. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $55\pm 2^{\circ}\text{C}$. The cell or battery must be observed for a further six hours for the test to be concluded.

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

6. Impact (for component cell)

The test sample cell or component cell is to be placed on a flat surface. A 15.8 mm diameter bar is to be placed across the center of the sample. A 9.1 kg mass is to be dropped from a height of 61 ± 2.5 cm onto the sample.

A cylindrical or prismatic cell is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm diameter curved surface lying across the center of the test sample. A prismatic cell is also to be rotated 90 degrees around its longitudinal axis so that both the wide and narrow side will be subjected to the impact. Each sample is to be subjected to only a single impact; Separate samples are to be used for each impact.

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

7. Overcharge

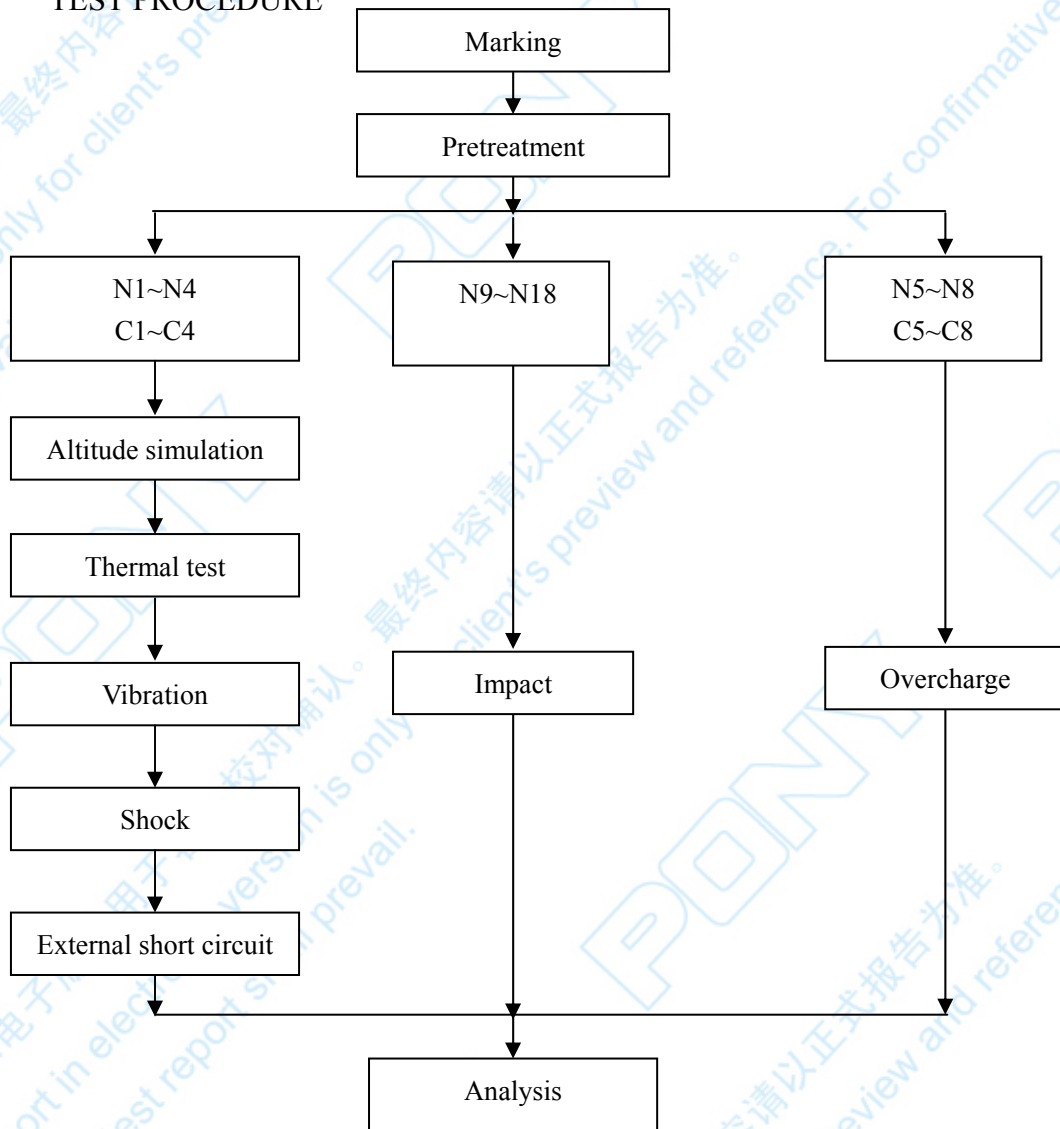
The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

- (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 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 within seven days of the test.

VII、 TEST PROCEDURE



VIII、 MAIN TEST APPARATUS

- | | |
|--|------------------------------------|
| SZSB-121 Rechargeable battery test system | SZSB-077 DC regulated power supply |
| SZSB-280 Vacuum chamber (for battery test) | SZSB-081 Impact test instrument |
| SZSB-120 Temperature circulation chamber | SZSB-125 Electronic balance |
| SZSB-128 Vibration test instrument | SZSB-090 Digital multimeter |
| SZSB-082 Shock test instrument | SZSB-185 Thermoelectric pair |
| SZSB-281 Battery anti-explosion chamber | |

IX、 DATA

1. Altitude simulation

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	20.026	4.17	20.025	4.17	0.005	0.00	PASS
N2	19.754	4.17	19.754	4.16	0.000	0.24	PASS
N3	19.960	4.17	19.959	4.17	0.005	0.00	PASS
N4	19.791	4.17	19.791	4.16	0.000	0.24	PASS
C1	19.950	4.17	19.950	4.17	0.000	0.00	PASS
C2	19.941	4.17	19.940	4.16	0.005	0.24	PASS
C3	19.855	4.17	19.855	4.17	0.000	0.00	PASS
C4	19.615	4.17	19.614	4.17	0.005	0.00	PASS

2. Thermal test

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	20.025	4.17	20.019	4.12	0.030	1.20	PASS
N2	19.754	4.16	19.747	4.13	0.035	0.72	PASS
N3	19.959	4.17	19.953	4.11	0.030	1.44	PASS
N4	19.791	4.16	19.785	4.13	0.030	0.72	PASS
C1	19.950	4.17	19.945	4.12	0.025	1.20	PASS
C2	19.940	4.16	19.934	4.13	0.030	0.72	PASS
C3	19.855	4.17	19.848	4.12	0.035	1.20	PASS
C4	19.614	4.17	19.608	4.12	0.031	1.20	PASS

3. Vibration

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	20.019	4.12	20.019	4.12	0.000	0.00	PASS
N2	19.747	4.13	19.746	4.12	0.005	0.24	PASS
N3	19.953	4.11	19.953	4.11	0.000	0.00	PASS
N4	19.785	4.13	19.785	4.13	0.000	0.00	PASS
C1	19.945	4.12	19.944	4.12	0.005	0.00	PASS
C2	19.934	4.13	19.933	4.12	0.005	0.24	PASS
C3	19.848	4.12	19.848	4.12	0.000	0.00	PASS
C4	19.608	4.12	19.607	4.11	0.005	0.24	PASS

4. Shock

NO.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	20.019	4.12	20.019	4.11	0.000	0.24	PASS
N2	19.746	4.12	19.745	4.12	0.005	0.00	PASS
N3	19.953	4.11	19.953	4.11	0.000	0.00	PASS
N4	19.785	4.13	19.785	4.12	0.000	0.24	PASS
C1	19.944	4.12	19.943	4.11	0.005	0.24	PASS
C2	19.933	4.12	19.933	4.12	0.000	0.00	PASS
C3	19.848	4.12	19.847	4.12	0.005	0.00	PASS
C4	19.607	4.11	19.607	4.11	0.000	0.00	PASS

5. External short circuit

No.	Peak temperature (°C)	Status
N1	58	PASS
N2	57	PASS
N3	56	PASS
N4	56	PASS
C1	55	PASS
C2	59	PASS
C3	57	PASS
C4	58	PASS

6. Impact (for component cell)

No.	Peak temperature (°C)	Status
N9	87	PASS
N10	86	PASS
N11	84	PASS
N12	89	PASS
N13	86	PASS
N14	83	PASS
N15	84	PASS
N16	88	PASS
N17	89	PASS
N18	88	PASS

7. Overcharge

No.	Status
N5	PASS
N6	PASS
N7	PASS
N8	PASS
C5	PASS
C6	PASS
C7	PASS
C8	PASS

8. Forced discharge (for cell)

N/A (Not applicable)