


惠州基安比新能源有限公司
Huizhou Markyn New Energy Co., LTD.

锂电池UN38.3测试报告

Lithium Battery UN38.3 Test Report

Sample Description

& Model Li Polymer Cell GMB221230

Applicant Huizhou Markyn New Energy Co., Ltd.

Manufacturer Huizhou Markyn New Energy Co., Ltd.



1. SAMPLES DESCRIPTION

Sample Description	Polymer Li-ion Cell	Sample Model	GMB221230		
Applicant	Huizhou Markyn New Energy Co., Ltd				
Manufacturer	Huizhou Markyn New Energy Co., Ltd				
Nominal Voltage	3.7v	Rated Capacity	60mAh	Limited Charge Voltage	4.2V
Charge Current	30mA	Maximum Continuous Current	30mA	End Charge Current	30mA
Cut-off Voltage	3.0V	Maximum Discharge Current	30mA	Use	Digital Production
Cells Number	1PCS	Cell Model	GMB221230	Cell Capacity	60mAh
Manufacturer of cell	GMB				
Chemical components	LiCoO2				
Client date	2017.3.29	Finish date	2017.4.6		

II REFERENCE METHOD

United Nations Recommendations On The Transport Of Dangerous Goods, Manual Of Tests And Criteria . (ST/SG/AC.10/11/Rev.5/Amend.1 & ST/SG/AC.10/11/Rev.5/Amend.2)

III TEST ITEM

- | | | |
|------------------------|----------|---------------------------|
| 1. Altitude simulation | | 5. External short circuit |
| 2. Thermal test | 6. Crush | |
| 3. Vibration | | 7. Forced discharge |
| 4. Shock | | |

IV CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation	N1~N10	UN38.3	PASS
Thermal test			PASS
Vibration			PASS
Shock			PASS
External short circuit			PASS
Crush	N11~N15		PASS
Forced discharge	N20~N29 C5~C14		PASS

The submitted cell and component cell complied with the UN Manual of Tests and Criteria, part III, sub-section 38.3.

Prepared by :

Checked by

Approved by

Issue Date: 2017-4-6





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VI、 TEST METHOD

Tests T.1 to T.S shall be conducted in sequence on the same cell or battery. Tests T.6 and T.7 shall be conducted using not otherwise tested cells or batteries.test

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

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

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 al “no mass loss”,

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g,≤M≤75g	0.2%
M>75g	0.1%

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% for 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 Thermal test

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 intervals 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 if 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 stages.



T.5 External short circuit

The cell or battery to be tested shall be temperature stabilized $55\pm 2^{\circ}\text{C}$ 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 $55\pm 2^{\circ}\text{C}$.

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 Impact/ Crush

Impact (applicable to cylindrical cells not less than 18mm in diameter)

The sample cell or component cell is to be placed dimension of the cell, whichever is greater, type 316 stainless steel bar is to be placed across the center of the sample, A 9.1kg \pm 0.1kg 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 $15.8\text{mm}\pm 0.1\text{mm}$ diameter curved surface lying across the center of the test sample, Each sample is to be subjected to only a single impact.

Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm 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 approximate 1.5cm/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 $13\text{kNz} + 0.78\text{kN}$;
- (b) The voltage of the cell drops by at least 100mV; 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 100mV 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 6H. 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 these requirements 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 Forced discharge



Each cells 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.



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IX. DATA

1. Altitude simulation

NO.	Pre-test		After test		Mass loss(%)	Voltage loss (%)	Whether leakage, Venting, disassembly, Rupture, fire(Y/N)
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	2.551	3.83	2.551	3.83	0.000	0.000	N
N2	2.511	3.86	2.511	3.86	0.000	0.000	N
N3	2.512	3.80	2.512	3.80	0.000	0.000	N
N4	2.522	3.81	2.522	3.81	0.000	0.000	N
N5	2.516	3.82	2.516	3.81	0.000	0.257	N
N6	2.520	3.90	2.52N				



3. Vibration

NO.	Pre-test		After test		Mass loss(%)	Voltage loss (%)	Whether leakage, Venting, disassembly, Rupture, fire(Y/N)
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	2.551	3.83	2.551	3.83	0.000	0.000	N
N2	2.511	3.86	2.511	3.86	0.000	0.000	N
N3	2.512	3.80	2.512	3.80	0.000	0.000	N
N4	2.522	3.81	2.522	3.81	0.000	0.000	N
N5	2.516	3.82	2.516	3.81	0.000	0.257	N
N6	2.520	3.90	2.520	3.90	0.000	0.000	N
N7	2.502	3.89	2.502	3.88	0.000	0.257	N
N8	2.531	3.88	2.531	3.88	0.000	0.000	N
N9	2.512	3.81	2.512	3.81	0.000	0.000	N
N10	2.522	3.80	2.522	3.80	0.000	0.000	N

4. Shock

NO.	Pre-test		After test		Mass loss(%)	Voltage loss (%)	Whether leakage, Venting, disassembly, Rupture, fire(Y/N)
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	2.551	3.83	2.551	3.83	0.000	0.000	N
N2	2.511	3.86	2.511	3.86	0.000	0.000	N
N3	2.512	3.80	2.512	3.80	0.000	0.000	N
N4	2.522	3.81	2.522	3.81	0.000	0.000	N
N5	2.516	3.82	2.516	3.81	0.000	0.257	N
N6	2.520	3.90	2.520	3.90	0.000	0.000	N
N7	2.502	3.89	2.502	3.88	0.000	0.257	N
N8	2.531	3.88	2.531	3.88	0.000	0.000	N
N9	2.512	3.81	2.512	3.81	0.000	0.000	N
N10	2.522	3.80	2.522	3.80	0.000	0.000	N



5. External short circuit

NO.	Peak temperature (°C)	Whether disassembly, rupture, fire (Y/N)
N1	56	N
N2	59	N
N3	57	N
N4	58	N
N5	56	N
N6	58	N
N7	59	N
N8	57	N
N9	56	N
N10	58	N

6. Crush

NO.	Peak temperature (°C)	Whether disassembly, fire (Y/N)
N11	26.9	N
N12	28	N
N13	27	N
N14	28	N
N15	28.3	N



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