



报告编号(Report ID): MMIF0NUM16765521

UN38.3 测试报告 UN38.3 Test Report

Sample Description & Model	Ex18650B1 Li-ion battery pack	Ex18650B1
Applicant	Ledlenser Corporation	Ltd.
Manufacturer	Ledlenser Corporation	Ltd.







教養用一月、使用小児子 小児子は一月、正統証でNo.: MMIF0NUM16765521Code: a85401m21

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I, SAMPLE DESCRIPTION

Sample Description	Ex186	550B1	Li-ion battery pack	Sample Model	Ex18650)B1	
Applicant			Led	lenser Corporation	Ltd.		
Manufacturer		Ledlenser Corporation Ltd.					
Nominal Voltage	al Voltage 3.6V		Rated Capacity	3.25Ah	Limited Charge Voltage	4.2V	
Charge Current 0.45A		5A	Maximum Continuous Charge Current	0.55A	End Charge Current	0.05A	
Cut-off Voltage	2.5V		Maximum Discharge Current	1.125A	Use		
Cell Number In Each Battery	1PCS		Cell Model	NCR18650BF	Cell Capacity	3.35Ah	
Electrochemistry System							
Manufacturer of cell				SANYO	a		
Entrust date		2018-08-03		Finished date	2018-09	-06	

II、TEST METHOD

UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.6), Part III sub-section.

III, TEST ITEM

- 1. Altitude simulation
- 2. Thermal test
- Vibration 3.
- Shock

5. External short circuit

- 6. Impact
- Overcharge 7.
- Forced discharge

IV, CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation			PASS
Thermal test	2		PASS
Vibration	N1~N10		PASS
Shock		UN38.3	PASS
External short circuit		ST/SG/AC.10/11/Rev.6	PASS
Impact	N11~N15		PASS
Overcharge	N16~N19 C1~C4		PASS
Forced discharge	N20~N29 C5~C14		PASS

The Samples has passed the test items of UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.6), Part III sub-section.

Appraiser: Jinshi kung

Checker:

in Je' Approver: Vishawbi'n

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Pony Testing International Group

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Notes:

N1~N10, N16~N19: Cells at first cycle in fully charged states;

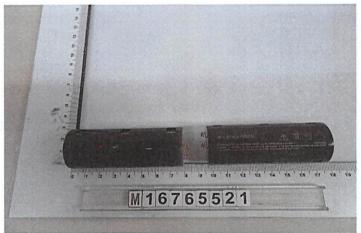
N11~N15: Cells at first cycle at 50% of the design rated capacity;

N20~N29: Cells at first cycle in fully discharged states;

C1~C4: Cells after 50 cycles ending in fully charged states;

C5~C14: Cells after 50 cycles ending in fully discharged states.

PHOTO OF THE SAMPLE





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VI. TEST METHOD

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:

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

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 blow, it shall be considered as "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 \pm 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 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 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.

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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 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 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 g_n occurs (approximately 25 Hz). A peak acceleration of 2 g_n 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 after testing in its 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 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 g_n 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 millisecondsfor small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

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Battery	Minimum peak acceleration	Pulse duration
	150 g _n or result of formula	1 - 6 1 1 1 7 7 7 8
Small batteries	Acceleration(g_n)= $\sqrt{\left(\frac{100850}{mass*}\right)}$	6 ms
	Whichever is smaller	
	$50 g_n$ or result of formula	
Large batteries	Acceleration(g_n)= $\sqrt{\frac{30000}{mass*}}$	11 ms
	Whichever is smaller	

^{*} 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 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°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℃ 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°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. 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.

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T.6 Impact / Crush

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

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 ± 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 ± 0.1 mm diameter curved surface lying across the centre 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 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 \pm 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 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 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.

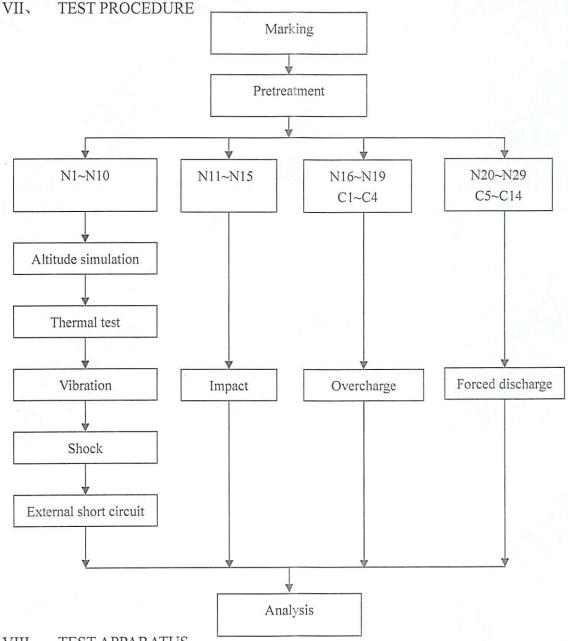
The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

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.

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VIII、 TEST APPARATUS

IE-0121 High precision battery test system

IE-0434 Vacuum drying oven

IE-0090 Multimeter

IE-0322 Tableland air pressure gauge

IE-0259 Electronic balance

IE-0219 Rapid temperature change test chamber

IE-0281 Temperature controlled short circuit testing machine

IE-0077 TPR series high precision DC regulated power supply

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IE-0503 Electric vibration test system

IE-0185 The digital thermometer (TC)

IE-0287 Vertical impact crash test platform

IE-0833 Battery heavy shock testing machine IE-0511 Programmable DC power source

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IX **DATA**

Altitude simulation

	Pre-	Pre-test		r test	Mass loss	Valtaga	Whether leakage,
No.	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)	(%)	Voltage loss (%)	venting, disassembly, rupture, fire (Y/N)
N1	76.519	4.163	76.499	4.162	0.026	0.024	N
N2	76.774	4.166	76.755	4.164	0.025	0.048	N
N3	76.426	4.161	76.408	4.161	0.024	0.000	N
N4	76.630	4.168	76.611	4.166	0.025	0.048	N
N5	76.617	4.164	76.596	4.164	0.027	0.000	N
N6	76.583	4.170	76.560	4.169	0.030	0.024	N
N7	76.582	4.169	76.564	4.166	0.024	0.072	N
N8	76.534	4.170	76.515	4.168	0.025	0.048	N
N9	76.817	4.165	76.797	4.163	0.026	0.048	N
N10	76.368	4.169	76.346	4.168	0.029	0.024	N

Thermal test

	Pre-	Pre-test		r test	- Mass loss	Voltage	Whether leakage,
No.	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)	(%)	loss (%)	venting, disassembly, rupture, fire (Y/N)
N1	76.499	4.162	76.485	4.097	0.018	1.562	N
N2	76.755	4.164	76.738	4.097	0.022	1.609	N
N3	76.408	4.161	76.393	4.094	0.020	1.610	N
N4	76.611	4.166	76.592	4.093	0.025	1.752	N
N5	76.596	4.164	76.583	4.096	0.017	1.633	N
N6	76.560	4.169	76.546	4.100	0.018	1.655	N
N7	76.564	4.166	76.549	4.099	0.020	1.608	N
N8	76.515	4.168	76.496	4.099	0.025	1.655	N
N9	76.797	4.163	76.782	4.097	0.020	1.585	N
N10	76.346	4.168	76.323	4.098	0.030	1.679	N

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3. Vibration

	Pre-	-test	Afte	r test	Mass loss	Voltage loss (%)	Whether leakage,
No.	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)	(%)		venting, disassembly, rupture, fire (Y/N)
N1	76.485	4.097	76.485	4.097	0.000	0.000	N
N2 -	76.738	4.097	76.738	4.096	0.000	0.024	N
N3	76.393	4.094	76.393	4.094	0.000	0.000	N
N4	76.592	4.093	76.591	4.093	0.001	0.000	N
N5	76.583	4.096	76.583	4.095	0.000	0.024	N
N6	76.546	4.100	76.546	4.100	0.000	0.000	N
N7	76.549	4.099	76.549	4.098	0.000	0.024	N
N8	76.496	4.099	76.496	4.099	0.000	0.000	N
N9	76.782	4.097	76.782	4.097	0.000	0.000	N
N10	76.323	4.098	76.321	4.096	0.003	0.049	N

Shock

	Pre-	-test	Afte	r test	- Mass loss	oss Voltage	Whether leakage,
No.	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)	(%)	loss (%)	venting, disassembly, rupture, fire (Y/N)
N1	76.485	4.097	76.484	4.097	0.001	0.000	N
N2	76.738	4.096	76.737	4.096	0.001	0.000	N
N3	76.393	4.094	76.391	4.094	0.003	0.000	N
N4	76.591	4.093	76.591	4.092	0.000	0.024	N
N5	76.583	4.095	76.583	4.094	0.000	0.024	N
N6	76.546	4.100	76.546	4.100	0.000	0.000	N
N7	76.549	4.098	76.549	4.097	0.000	0.024	N
N8	76.496	4.099	76.495	4.099	0.001	0.000	N
N9	76.782	4.097	76.781	4.097	0.001	0.000	N
N10	76.321	4.096	76.321	4.096	0.000	0.000	N

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External short circuit

No.	Peak temperature (°C)	Whether disassembly, rupture, fire (Y/N)
N1	57.6	N
N2	57.5	N
N3	57.7	N
N4	57.6	N
N5	57.7	N
N6	57.9	N
N7	57.6	N
N8	57.4	N
N9	57.5	N
N10	57.6	N

Impact

No.	Peak temperature (°C)	Whether disassembly, fire (Y/N)
N11	112.2	N
N12	112.9	N
N13	113.0	N
N14	115.3	N
N15	117.0	N

Overcharge

No.	Whether disassembly, fire (Y/N)				
N16	N	21.1			
N17	N	21 - L. L. X			
N18	N				
N19	N				
C1	N				
C2	N				
C3	N				
C4	N				

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Forced discharge

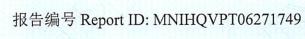
No.	Whether disassembly, fire (Y/N)				
N20	N				
N21	N				
N22	N				
N23	N				
N24	N				
N25	N				
N26	N				
N27	N				
N28	N				
N29	N				
C5	N				
C6	N				
C7	N				
C8	N				
C9	N				
C10	N				
C11	N				
C12	N				
C13	N				
C14	N				

*** End of report ***

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锂电池或锂电池组 UN38.3 试验概要 Lithium Cell or Battery UN38.3 Test Summary

单位信息 Company information

委托单位 Applicant:		阳江纳谷科技有限公司 Ledlenser Corporation Ltd.		
生产商 Manufacturer	名称 Name	阳江纳谷科技有限公司 Ledlenser Corporation Ltd.		
	地址 Address	广东省阳江市阳东区东城镇裕东一路 25 号 No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD, 529931,PR.China		
	电话 Tel.	0662-6603655		
	邮箱 E-mail	kitty@ledlenser.cn		
	网址 Website	www.ledlenser.com/cn		
测试单位 Test Lab.	名称 Name	谱尼测试集团深圳有限公司 Pony Testing Group Shenzhen Co., Ltd.		
	地址 Address	深圳市宝安区福海街道和平社区骏丰中城智造创新园 A2 栋一层 1/F., Building A2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Road, Bao'an District, Shenzhen, Guangdong, China		
	电话 Tel.	86-755-26050909		
	邮箱 E-mail	cst@ponytest.com		
	网址 Website	www.ponytest.com		

样品信息 Sample information:

THE IE W Sample mornia	ion.		
样品名称 Sample name	Ex18650B1 锂离子电池包 Ex18650B1 Li-ion battery pack	样品型号 Sample model	Ex18650B1
原始测试型号 Original tested type	1	产品参数 Sample parameter	3.6V 3.25Ah
样品质量 Sample mass	77.27g	额定瓦时 Watt-hour rating	11.7Wh
电池或电池组类型	锂离子电池芯	物理形状	黑色圆柱形
cell or battery type	Lithium ion cell	Physical description:	Black Cylindrical
原报告编号 Original test report No.	MMIF0NUM16765521	测试报告日期 Date of test report	2018-09-06





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测试方法 Test method:

《联合国关于危险品运输的建议书 试验和标准手册》 第六修订版第III部分 38.3 章节 United nations "recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria 38.3(ST/SG/AC.10/11/Rev.6)

测试项目及结论 Test item & conclusion:

对自 及组化 Test item e	Concinuit		
测试项目 Test item	结论 Conclusion	测试项目 Test item	结论 Conclusion
T1: 高度模拟 Altitude Simulation	通过 Pass	T5: 外部短路 External short circuit	通过 Pass
T2: 温度试验 Thermal test	通过 Pass	T6: 撞击 Impact	通过 Pass
T3:振动 Vibration	通过 Pass	T7: 过度充电 Overcharge	通过 Pass
T4: 冲击 Shock	通过 Pass	T8: 强制放电 Forced discharge	通过 Pass
38.3.3 (f)	不适用 Not Applicable	38.3.3 (g)	不适用 Not Applicable

The state of the s

样品图片 Sample Picture

(LEDLENSER EX18650B1 Li-ion BATTERY PACK 3.6V 3250 TO ALCOLONISM WARNING! - USE ONLY IN LEDLENSER EXTR AND EXHIBIT OF DEPOT IN ATMOSPHERE EXPLANATION OF PAS INSTALLER LA BATTERIE EN ATMOSPHERE EXP

测试结论 Test Conclusion

测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》第六修订版第Ⅲ 部分38.3章节要求。

The tested samples meet the requirements of test items of the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" manual of TESTS AND Criteria ST/SG/AC.10/11/Rev.6 38.3.

备注 Remark

签名 Signature 技术经理 Technical Manager

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