



中国认可
国际互认
检测
TESTING
CNAS L13261

Report No.: KS2303S1343B01

UN38.3 Test Report

Samples Name Lithium ion battery

样品名称 锂离子电池

Model

型号

C

Applicant

委托单位

Shenzhen AVEnergy Technology CO., LTD

深圳市安为创能科技有限公司



广东科正技术服务有限公司
K SIGN(Guangdong) Testing Co., Ltd.

General Information 基本资料			
Sample Name 样品名称	Lithium ion battery 锂离子电池	Model Name 型号	C
Rated 额定	1.5Vd.c., 3700mAh	Watt-hour 瓦时	5550mWh
Dimension 尺寸(D*H)	φ 25.6*49.1 (mm)	Weight 重量	Appr.: 43.2g
Sample Status 样品状态	Good 良好	Sample Information 样品信息	Single cell battery(with overcharge protection) 单电芯电池 (有过充保护)
Applicant 委托单位	Shenzhen AVEnergy Technology CO., LTD 深圳市安为创能科技有限公司		
Applicant Address 委托单位地址	Room 203, Building A, Dingsheng Building, Xifa Community, Yintian Industrial Zone, Gongle Community, Xixiang Street, Baoan District, Shenzhen 深圳市宝安区西乡街道共乐社区银田工业区西发小区鼎盛大厦 A 座 203		
Factory 生产工厂	Guizhou AVEnergy Technology CO., LTD 贵州安为创能科技有限公司		
Factory Address 生产工厂地址	Floor 1-3, Building D7, Intelligent terminal Industrial Park, Xixiu Industrial Park, Xinan street, Xixiu District, Anshun City, Guizhou Province 贵州省安顺市西秀区新安街道西秀产业园智能终端产业园 D7 栋厂房 1-3 层		
Factory Telephone 生产工厂电话	+86-19336790610	Factory Email 生产工厂邮箱	huangzhihua@ferexave.com
Factory Web 生产工厂网址	www.awcnkj.com		
Test Method & Criterion 检验方法及判定标准	UNITED NATION "Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Test and Criteria " ST/SG/AC.10/11/Rev.7/Amend.1 38.3 联合国《关于危险品货物运输的建议书试验和标准手册》第七修订版,修正 1 第 38.3 节		
Testing Laboratory 检测单位	KSIGN(Guangdong) Testing Co., Ltd. 广东科正技术服务有限公司 West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China 广东省深圳市宝安区沙井街道沙头社区民主九九工业区福源厂新厂房A区C栋一层西侧, 518104		
Sample Receiving Date 收样接收日期	2023 年 03 月 30 日	Test Date 测试日期	2023 年 04 月 03 日 to 2023 年 04 月 18 日
Conclusion 测试结论	The samples has passed the test items of UNITED NATION "Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Test and Criteria " ST/SG/AC.10/11/Rev.7/Amend.1 38.3.受检样品通过联合国《关于危险品货物运输的建议书试验和标准手册》第七修订版,修正 1 第 38.3 节各项检测, 检测结果合格。 Seal/签章: Date of issue/签发日期: 2023 年 04 月 19 日		

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Test Summary Lists

测试摘要列表

Test No. 测试编号	Test Item 测试项目	Test Results 测试结果	Conclusion 本项结论
T1	Altitude simulation / 高度模拟	See Appendix 1 见附表1	Passed 合格
T2	Thermal test / 温度试验	See Appendix 2 见附表2	Passed 合格
T3	Vibration / 振动测试	See Appendix 3 见附表3	Passed 合格
T4	Shock / 冲击测试	See Appendix 4 见附表4	Passed 合格
T5	External short circuit / 外部短路	See Appendix 5 见附表5	Passed 合格
T6	Impact / 撞击	See Appendix 6 见附表6	Passed 合格
	Crush / 挤压	N/A 不适用	N/A 不适用
T7	Overcharge / 过度充电	See Appendix 7 见附表7	Passed 合格
T8	Forced discharge / 强制放电测试	See Appendix 8 见附表8	Passed 合格
Remark 备注	<p>1) Impact test applicable to cylindrical cells not less than 18.0mm in diameter. 撞击试验适用于直径不小于 18.0mm 的圆柱形电芯。</p> <p>2) Crush test applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0mm in diameter. 挤压试验适用于棱柱形、袋状、硬币/纽扣电芯和直径不超过 18.0mm 的圆柱形电芯。</p> <p>3) Batteries or single cell batteries not equipped with battery overcharge protection that are designed for use only as a component in another battery or in equipment, which affords such protection, are not applicable to overcharge test. 未安装过度充电保护装置、按设计要求只能作为部件用在另一个带过度充电保护装置的电池组或设备中的电池组或单一电池电池组，无需满足过充试验的要求。</p>		

Test Item 测试项目	Sample No. 样品编号	Sample State 样品状态
T1~T5	B01~ B05	At first cycle, in fully charged states 第1个充放电周期，完全充电状态
	B06~B10	After 25 cycles ending in fully charged states 第25个充放电周期，完全充电状态
T6	C01~C05	At first cycle at 50% of the design rated capacity 第1个充放电周期 50%设计额定容量状态
	C06~C10	After 25 cycle at 50% of the design rated capacity 第25个充放电周期 50%设计额定容量状态
T7	B11~ B14	At first cycle, in fully charged states 第1个充放电周期，完全充电状态
	B15~ B18	After 25 cycles ending in fully charged states 第25个充放电周期，完全充电状态
T8	C11~C20	At first cycle in fully discharged states 第1个充放电周期，完全放电状态
	C21~C30	After 25 cycles ending in fully discharged states 第25个充放电周期，完全放电状态

The above samples have been charged and discharged cycles by the factory as required before the test.
备注：以上样品在测试前已由工厂按要求进行充放电循环处理。

Appendix 1 附表 1

Test Items 测试项目	Altitude simulation 高度模拟						
1.1	Test procedure 测试步骤						
	<p>Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hour at ambient temperature (20±5℃).</p> <p>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.</p> <p>试验电芯和电池在环境温度(20±5℃)下, 储存在小于等于11.6kPa的压力下至少六小时。</p> <p>试验电芯或电池应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧, 并且每个试验电芯或电池在试验后的开路电压不少于其在进行这一试验前电压的 90% (完全放电状态的试验电芯或电池除外)。</p>						
1.2	Result 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B01	43.215	1.518	43.211	1.516	0.01	99.87	O
B02	43.005	1.517	43.004	1.516	0.00	99.93	O
B03	42.809	1.516	42.804	1.515	0.01	99.93	O
B04	42.921	1.518	42.920	1.516	0.00	99.87	O
B05	42.707	1.517	42.703	1.516	0.01	99.93	O
B06	42.955	1.514	42.954	1.513	0.00	99.93	O
B07	43.102	1.515	43.100	1.514	0.00	99.93	O
B08	42.776	1.516	42.773	1.515	0.01	99.93	O
B09	42.695	1.514	42.691	1.513	0.01	99.93	O
B10	43.200	1.516	43.198	1.516	0.00	100.00	O
<p>Note: L- Leakage, V- Venting, D- Disassembly, R- Rupture, F- Fire, O- No leakage, no venting, no disassembly, no rupture, no fire, no mass loss, change ratio is not less than 90 %.</p> <p>注: L- 泄漏; V- 排气; D- 解体; R- 破裂; F- 起火; O- 无泄漏、无排气、无解体、无破裂、无起火、无质量损失、电压比不小于 90 %。</p>							

Appendix 2 附表 2

Test Items 测试项目	Thermal test 温度试验						
2.1	Test procedure 测试步骤						
	<p>Test cells and batteries are to be stored for at least six hours at a test temperature equal to $72 \pm 2^\circ\text{C}$, followed by storage for at least six hours at a test temperature equal to $-40 \pm 2^\circ\text{C}$. The maximum time interval between test temperature extremes in 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 ($20 \pm 5^\circ\text{C}$). For large cells and batteries, the duration of exposure to the test temperature extremes should be at least 12 hours.</p> <p>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.</p> <p>将电芯和电池在温度为$72 \pm 2^\circ\text{C}$的条件下贮存不少于6个小时，然后，在温度$-40 \pm 2^\circ\text{C}$条件下贮存不少于6个小时，两个温度间的间隔最长为30min，重复操作上述步骤直到10次，然后，将其在环境温度温度为$20 \pm 5^\circ\text{C}$的条件下放置24个小时。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。</p> <p>试验电芯或电池应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电芯或电池在试验后的开路电压不少于其在进行这一试验前电压的90%（完全放电状态的试验电池或电池除外）。</p>						
2.2	Result 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B01	43.211	1.516	43.202	1.505	0.02	99.27	O
B02	43.004	1.516	42.992	1.506	0.03	99.34	O
B03	42.804	1.515	42.795	1.507	0.02	99.47	O
B04	42.920	1.516	42.912	1.507	0.02	99.41	O
B05	42.703	1.516	42.689	1.509	0.03	99.54	O
B06	42.954	1.513	42.945	1.503	0.02	99.34	O
B07	43.100	1.514	43.089	1.505	0.03	99.41	O
B08	42.773	1.515	42.765	1.505	0.02	99.34	O
B09	42.691	1.513	42.678	1.505	0.03	99.47	O
B10	43.198	1.516	43.190	1.506	0.02	99.34	O

Note: L- Leakage, V- Venting, D- Disassembly, R- Rupture, F- Fire,

O- No leakage, no venting, no disassembly, no rupture, no fire, no mass loss, change ratio is not less than 90 %.

注: **L**- 泄漏; **V**- 排气; **D**- 解体; **R**- 破裂; **F**- 起火;

O- 无泄漏、无排气、无解体、无破裂、无起火、无质量损失、电压比不小于 90 %。

Appendix 3

附表 3

Test Items 测试项目	Vibration 振动
3.1	Test procedure 测试步骤
	<p>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 wave form with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15minutes, this cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting position of the cell. One of the directions of vibration must be perpendicular to the terminal face.</p> <p>The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12kg (cells and small batteries), and for batteries with a gross mass of more than 12kg (large batteries).</p> <p>For cells and small batteries: from 7Hz a peak acceleration of 1gn 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 8gn occurs (approximately 50Hz). A peak acceleration of 8gn is then maintained until the frequency is increased to 200Hz.</p> <p>For large batteries: from 7Hz to a peak acceleration of 1gn 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 2gn occurs (approximately 25Hz). A peak acceleration of 2gn is then maintained until the frequency is increased to 200Hz.</p> <p>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.</p> <p>将电芯和电池牢固地安装在振动台的台面上，然后开始振动。振动以正弦波形式，以 7Hz 增加至 200Hz，然后再减少回到 7Hz 为一个循环，一个循环持续 15 分钟的对数扫频。每个电芯和电池从三个互相垂直的方向上循环 12 次，每个方向共计 3 个小时。其中一个振动方向必须是垂直样品的极性平面。</p> <p>对于质量不大于 12kg 的样品(电芯和小电池)和质量超过 12kg 的电池(大电池)，对数扫频不同。</p> <p>对于电芯和小电池，对数扫频为：从 7Hz 开始保持 1gn 的最大加速度直到频率为 18Hz，然后将振幅保持在 0.8mm (总偏移 1.6mm) 并增加频率直到最大加速度达到 8gn (频率约为 50Hz)，将最大加速度保持在 8gn 直到频率增加到 200Hz。</p> <p>对于大电池，对数扫频为：从 7Hz 开始保持 1gn 的最大加速度直到频率为 18Hz，然后将振幅保持在 0.8mm (总偏移 1.6mm) 并增加频率直到最大加速度达到 2gn (频率约为 25Hz)，将最大加速度保持在 2gn 直到频率增加到 200Hz。</p> <p>试验电芯或电池应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电芯或电池在试验后的开路电压不少于其在进行这一试验前电压的 90% (完全放电状态的试验电芯或电池除外)。</p>

Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
	B01	43.202	1.505	43.198			
B02	42.992	1.506	42.988	1.504	0.01	99.87	O
B03	42.795	1.507	42.793	1.506	0.00	99.93	O
B04	42.912	1.507	42.910	1.506	0.00	99.93	O
B05	42.689	1.509	42.685	1.507	0.01	99.87	O
B06	42.945	1.503	42.941	1.502	0.01	99.93	O
B07	43.089	1.505	43.087	1.504	0.00	99.93	O
B08	42.765	1.505	42.762	1.504	0.01	99.93	O
B09	42.678	1.505	42.675	1.504	0.01	99.93	O
B10	43.190	1.506	43.188	1.505	0.00	99.93	O

Note: **L**- Leakage, **V**- Venting, **D**- Disassembly, **R**- Rupture, **F**- Fire,
O- No leakage, no venting, no disassembly, no rupture, no fire, no mass loss, change ratio is not less than 90 %.

注: **L**- 泄漏; **V**- 排气; **D**- 解体; **R**- 破裂; **F**- 起火;
O- 无泄漏、无排气、无解体、无破裂、无起火、无质量损失、电压比不小于 90 %。

Appendix 4
附表 4

<p>Test Items 测试项目</p>	<p>Shock 冲击</p>									
<p>4.1</p>	<p>Test procedure 测试步骤</p>									
<p>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 150gn and pulse duration of 6milliseconds. Alternatively, large cells may besubjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds. Each battery shall be subjected to a half-sine shock of peak acceleration depending on themass 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.</p> <p>将试验电芯和电池用坚硬的支架固定在试验装置上， 支架支撑着每个试验电池的所有安装面;电芯经受峰值加速度150gn和脉冲持续时间6ms的半正弦波冲击;大电芯需经受峰值加速度50gn和脉冲持续时间11ms的半正弦波冲击;每个电池需经受半正弦波冲击的峰值加速度取决于电池的质量。小型电池的脉冲持续时间为6ms， 大型电池为11ms。以下提供的公式用来计算适合的最小峰值加速度。</p> <table border="1" data-bbox="512 829 1337 1234"> <thead> <tr> <th>Battery</th> <th>Minimum peak acceleration</th> <th>Pulse duration</th> </tr> </thead> <tbody> <tr> <td>Small batteries</td> <td>150 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{100850}{\text{mass}^*}}$ whichever is smaller </td> <td>6 ms</td> </tr> <tr> <td>Large batteries</td> <td>50 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{30000}{\text{mass}^*}}$ whichever is smaller </td> <td>11 ms</td> </tr> </tbody> </table> <p>Note: "**" Mass is expressed in kilograms</p> <p>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.</p> <p>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.(NOTE: Mass is express in kilograms)</p> <p>每个电芯或电池须在三个互相垂直的电芯安装方位的正方向经受三次冲击， 接着反方向经受三次冲击， 总共经受 18 次冲击。</p> <p>各试验电芯或电池应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧， 并且每个试验电芯或电池在试验后的开路电压不少于其在进行这一试验前电压的 90%（完全放电状态的试验电芯或电池除外）。</p>		Battery	Minimum peak acceleration	Pulse duration	Small batteries	150 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{100850}{\text{mass}^*}}$ whichever is smaller	6 ms	Large batteries	50 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{30000}{\text{mass}^*}}$ whichever is smaller	11 ms
Battery	Minimum peak acceleration	Pulse duration								
Small batteries	150 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{100850}{\text{mass}^*}}$ whichever is smaller	6 ms								
Large batteries	50 gn or result of formula $\text{Acceleration(gn)} = \sqrt{\frac{30000}{\text{mass}^*}}$ whichever is smaller	11 ms								

4.2 Result 测试结果							
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B01	43.198	1.504	43.196	1.503	0.00	99.93	O
B02	42.988	1.504	42.986	1.503	0.00	99.93	O
B03	42.793	1.506	42.790	1.504	0.01	99.87	O
B04	42.910	1.506	42.907	1.505	0.01	99.93	O
B05	42.685	1.507	42.683	1.506	0.00	99.93	O
B06	42.941	1.502	42.938	1.502	0.01	100.00	O
B07	43.087	1.504	43.083	1.503	0.01	99.93	O
B08	42.762	1.504	42.760	1.503	0.00	99.93	O
B09	42.675	1.504	42.674	1.503	0.00	99.93	O
B10	43.188	1.505	43.185	1.504	0.01	99.93	O

Note: **L**- Leakage, **V**- Venting, **D**- Disassembly, **R**- Rupture, **F**- Fire,

O- No leakage, no venting, no disassembly, no rupture, no fire, no mass loss, change ratio is not less than 90 %.

注: **L**- 泄漏; **V**- 排气; **D**- 解体; **R**- 破裂; **F**- 起火;

O- 无泄漏、无排气、无解体、无破裂、无起火、无质量损失、电压比不小于 90 %。

Appendix 5 附表 5

Test Items 测试项目	External short circuit 外部短路	
5.1	Test procedure 测试步骤	
	<p>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.</p> <p>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.</p> <p>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 within six hours of this test.</p> <p>测试的电芯或电池外壳温度达到恒温57 ± 4 °C后，再进行外部短路。短路的时间取决于电芯或电池的尺寸和设计，并需被评估和记录。如果这个评估无法进行，那么小电芯和小电池短路时间至少6小时，大电芯和大电池短路时间至少12小时。然后电芯或电池在57 ± 4 °C环境下经受一个阻值小于0.1Ω的外部电路短路。</p> <p>电芯或电池温度到57 ± 4 °C之后，短路时间需持续1小时，大型电池短路温度下降到最大温升的一半并保持。</p> <p>短路和降温阶段至少应在环境温度下进行。</p> <p>电芯或电池的外壳温度应不超过 170°C，并且试验后6h 内应无解体、无破裂和无燃烧。</p>	
5.2	Result 测试结果	
Sample No. 样品编号	Max. External Temperature 样品表面最高温度(°C)	Test result 测试结果
B01	58.6	O
B02	58.3	O
B03	58.3	O
B04	58.2	O
B05	58.4	O
B06	57.8	O
B07	57.9	O
B08	58.1	O
B09	58.0	O
B10	58.4	O

Note: **D**- Disassembly, **R**- Rupture, **F**- Fire, **O**- No disassembly, no rupture, no fire, test sample external temperature does not exceed 170 °C.

注: **D**- 解体; **R**- 破裂; **F**- 起火; **O**- 无解体、无破裂、无起火, 测试样品表面温度不超过 170 °C。

Appendix 6 附表 6

Test Items 测试项目	<input checked="" type="checkbox"/> Impact 撞击 <input type="checkbox"/> Crush 挤压	
6.1	Test procedure 测试步骤	
	<p>The sample cell or component cell is to be placed on a flat smooth surface. A 15.8mm ± 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 9.1kg ± 0.1kg mass is to be dropped from a height of 61 ± 2.5cm 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.</p> <p>The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8mm ± 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single 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 during the test and within six hours after this test.</p> <p>将试验电池或元件电芯放在平坦光滑的表面上。一根 316 型不锈钢棒横放在试样中心, 钢棒直径 15.8mm ± 0.1mm, 长度至少 6cm, 或电池最长端的尺度, 取二者之长者。将一块 9.1kg ± 0.1kg 的重锤从 61 ± 2.5cm 高处跌落到钢棒和试样交叉处, 使用一个几乎没有摩擦的, 对落体重锤力最小的垂直轨道或管道加以控制。垂直管道或管道用于引导落锤沿与水平支撑表面呈 90° 落下。接受撞击的试样, 纵轴应与平坦表面平行并与横放在试样中心的直径 15.8mm ± 0.1mm 弯曲表面的纵轴垂直; 每一个试样只经受一次撞击。</p> <p>试验电芯或电池的组成电芯外部温度不超过 170°C, 并且在试验过程中和试验后 6 小时内应无解体、无破裂、无起火。</p>	
6.2	Result 测试结果	
Sample No. 样品编号	Max. External Temperature 样品表面最高温度(°C)	Test result 测试结果
C01	24.5	O
C02	24.2	O
C03	24.3	O
C04	24.6	O
C05	24.0	O
C06	24.1	O
C07	24.2	O
C08	24.4	O
C09	24.3	O
C10	24.0	O

Note: **D**- Disassembly, **F**- Fire, **O**- No disassembly, no fire, test sample external temperature does not exceed 170 °C.

注: **D**- 解体; **F**- 起火; **O**- 无解体、无起火, 测试样品表面温度不超过 170 °C。

Appendix 7 附表 7

Test Items 测试项目	Overcharge 过度充电	
7.1	Test procedure 测试步骤	
	<p>The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The duration of the test shall be 24 hours. The minimum voltage of the test shall be as follows: 充电电流必须是制造商建议的最大持续充电电流的两倍, 测试时间为24小时。试验的最小电压如下:</p>	
	<p>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 or 22V. Rechargeable batteries meet this requirement if there is no disassembly and no fire within seven days of the test. 如果厂家推荐的充电电压不超过 18V, 则测试电压是两倍的厂家推荐的最大充电电压或者 22V 之间的较小值。 试验样品在试验后 7 天内应无解体和无燃烧。</p>	<p>The specified maximum charge voltage is 6.5V; The specified maximum charge current is 520mA; The test voltage is 13V; The test current is 1040mA. 厂家规定的最大充电电压为6.5V; 厂家规定的最大充电电流为520mA; 测试电压为13V; 测试电流为1040mA。</p>
	<p>When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times maximum charge voltage. Rechargeable batteries meet this requirement if there is no disassembly and no fire within seven days of the test. 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为 1.2 倍的厂家推荐的最大充电电压。 试验样品在试验后 7 天内应无解体和无燃烧。</p>	N/A 不适用
7.2	Result 测试结果	
Sample No. 样品编号	Voltage Before test(V) 测试前开路电压(V)	Test result 测试结果
B11	1.518	O
B12	1.517	O
B13	1.514	O
B14	1.513	O
B15	1.514	O

B16	1.515	O
B17	1.516	O
B18	1.515	O

Note: **D**- Disassembly, **F**- Fire, **O**- No disassembly, no fire.

注: **D**- 解体; **F**- 起火; **O**- 无解体、无起火。

Appendix 8

附表 8

Test Items 测试项目	Forced discharge 强制放电				
8.1	Test procedure 测试步骤				
	<p>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 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 within seven days of the test.</p> <p>每个电芯应在环境温度下与 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。指定的放电电流通过串联在测试电芯上的合适大小和功率的负载来获得，每个电芯的强制放电时间(小时)为额定容量除以初始电流(安培)。原电池或可再充电电池在试验后 7 天内应无解体和无燃烧。</p>				
8.2	Result 测试结果				
Sample No. 样品编号	Voltage Before test 测试前开路电压(V)	Test result 测试结果	Sample No. 样品编号	Voltage Before test 测试前开路电压(V)	Test result 测试结果
C11	3.440	O	C21	3.431	O
C12	3.435	O	C22	3.435	O
C13	3.437	O	C23	3.434	O
C14	3.436	O	C24	3.432	O
C15	3.438	O	C25	3.433	O
C16	3.432	O	C26	3.430	O
C17	3.435	O	C27	3.429	O
C18	3.434	O	C28	3.428	O
C19	3.436	O	C29	3.430	O
C20	3.433	O	C30	3.431	O

Note: **D**- Disassembly, **F**- Fire, **O**- No disassembly, no fire.

注: **D**- 解体; **F**- 起火; **O**- 无解体、无起火

Photos of samples 样品图片



Figure 1 Front view of battery



Figure 2 Back view of battery

Photos of samples

样品图片



Figure 3 Front view of cell

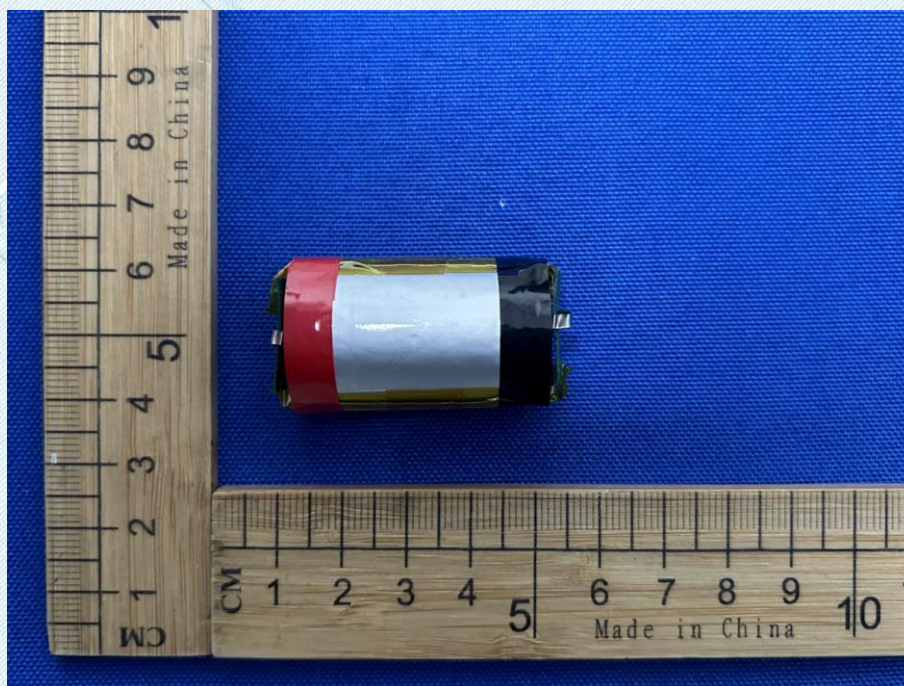


Figure 4 Back view of cell

Photos of samples
样品图片

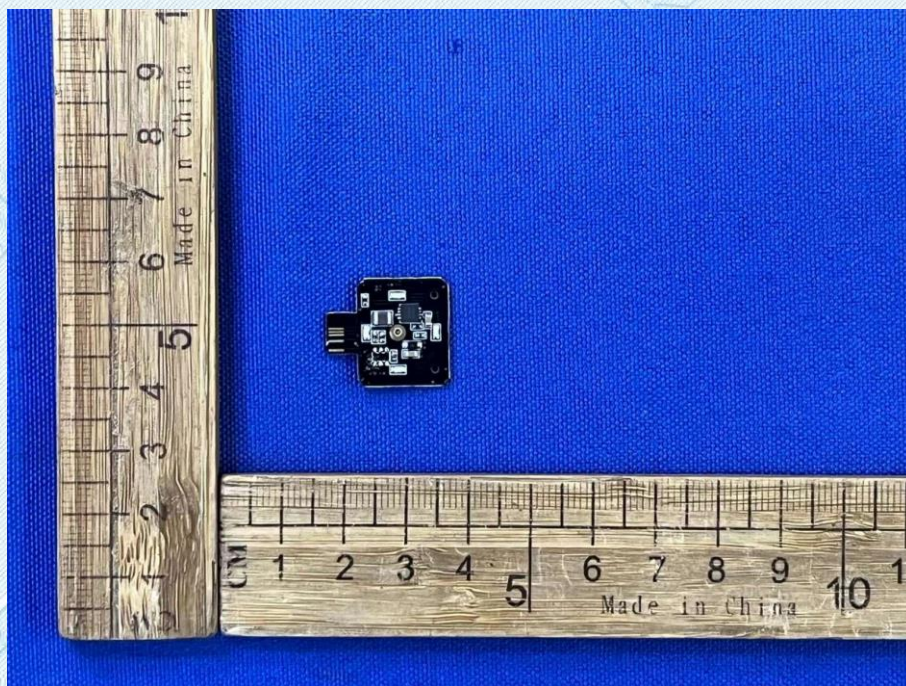


Figure 5 Front view of PCB

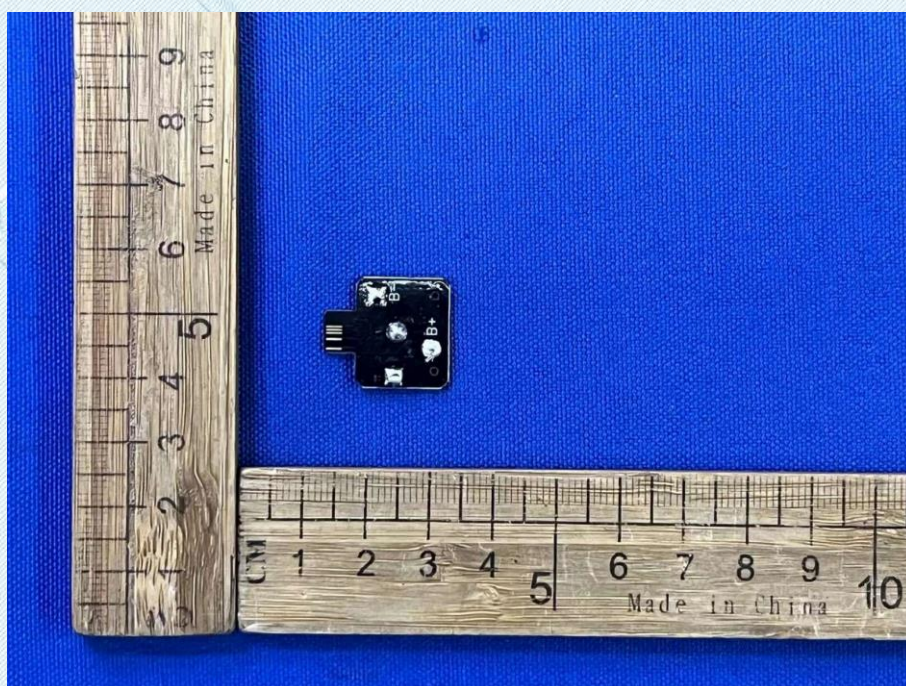


Figure 6 Back view of PCB

Important Notice

注意事项

1. The report is invalid if it is not stamped with the "Testing Special Stamp" and the "Riding Seam Stamp".

报告未加盖“检测专用章”和“骑缝章”无效。

2. The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.

本报告书无批准人、审核人、及主检人签名无效。

3. The test report can not be partially copied unless prior written approval is issued from our lab.

检测报告未经本实验室书面批准，不得部分复制。

4. The report is invalid when anything of following happens – illegal transfer, reproduce, embezzlement, imposture, modification or tampering in any media form.

私自转让、复制、盗用、冒用、涂改、或以任何媒体形式篡改的报告无效。

5. Product information and customer information provided by the applicant, we are not responsible for its authenticity.

产品信息和客户信息由申请人提供，我们不对其真实性负责。

6. The test report is valid for the tested samples only.

本报告仅对本次测试样品有效。

7. If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

如对本报告有异议，可在收到报告后15天内向本单位申诉，逾期不予受理。

检测单位： 广东科正技术服务有限公司

Laboratory KSIGN(Guangdong) Testing Co., Ltd.

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--- End of Report ---

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