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## UN38.3 报告

### UN38.3 Test Report

样品名称: 可充电锂离子电池模块

Sample Name: Rechargeable Li-ion Battery Module

委托单位: 广州三晶电气股份有限公司

Guangzhou Sanjing Electric Co., Ltd.

Applicant:



广州海关技术中心

GUANGZHOU CUSTOMS DISTRICT TECHNOLOGY CENTER

P886YBJMX6



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## 检测证书 TEST REPORT

|  |   |                   |                       |
|--|---|-------------------|-----------------------|
| 样品名称<br>Sample Name                    | 可充电锂离子电池模块<br>Rechargeable Li-ion Battery Module  |                   |                       |
| 型号<br>Model                            | BU2-5.0-HV5   |                   |                       |
| 委托单位<br>Applicant                      | 广州三晶电气股份有限公司<br>Guangzhou Sanjing Electric Co., Ltd.  |                   |                       |
| 委托单位地址<br>Applicant Address            | 中国广东广州高新技术产业开发区科学城荔枝山路9号<br>No. 9, Lizhishan Road, Science City, Guangzhou High-tech Zone, Guangdong, P.R.China   |                   |                       |
| 生产单位<br>Manufacture                    | 广州三晶电气股份有限公司<br>Guangzhou Sanjing Electric Co., Ltd.  |                   |                       |
| 生产单位地址<br>Manufacture Address          | 中国广东广州高新技术产业开发区科学城荔枝山路9号<br>No. 9, Lizhishan Road, Science City, Guangzhou High-tech Zone, Guangdong, P.R.China   |                   |                       |
| 样品外观与性状<br>Appearance & Odor           | 白色金属外壳<br>white metal shell   |                   |                       |
| 测试方法和判定标准<br>Test method and criterion | 联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7, 38.3<br>UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS", Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3  |                   |                       |
| 接样时间<br>Accepted date                  | 2022-08-25  | 测试日期<br>Test date | 2022-08-30~2022-09-16 |
| 测试项目<br>Test items                     | 高度模拟、温度试验、振动、冲击、外部短路、挤压、过度充电、强制放电。<br>Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Crush, Overcharge, Forced discharge.   |                   |                       |
| 结论<br>Conclusion                       | 经测试, 该样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7, 38.3 标准要求。<br>The sample has passed the test items of UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS", Manual of Test and Criteria ST/SG/AC.10/11/Rev.7, 38.3.  |                   |                       |
| 备注<br>Remark                           | 1. 本报告与 01112200002561-1(E)报告的样品差异在于: 仅样品名称变更, 无导致任何试验不符合要求的变化。<br>The differences between this report and the 01112200002561-1 (E) report are as follows: The samples are only change in sample name, and there is no change that would lead to failure of any tests.<br>2. 随附 UN38.3 试验概要 (编号: 01112300000200-2(E))。<br>Attached with UN38.3 test summary (No.: 01112300000200-2(E)). |                   |                       |

批准

Approver:

陆路强

审核

Checker:

邱初唯

主检

Appraiser:

张佳





# 广州海关技术中心

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## 电池组信息:

### The batteries information:

|                                      |                                    |                                     |                   |
|--------------------------------------|------------------------------------|-------------------------------------|-------------------|
| 电池类型<br>Battery type                 | 锂离子电池组<br>Lithium ion batteries    | 标称电压<br>Nominal Voltage             | 102.4V            |
| 额定容量<br>Rated Capacity               | 50Ah                               | 总能量<br>Total Energy                 | 5120Wh            |
| 充电限制电压<br>Limited Charge Voltage     | 116.8V                             | 标准充电电流<br>Standard Charge Current   | 30A               |
| 最大充电电流<br>Maximum Charge Current     | 50A                                | 充电截止电流<br>Charge Cut-off Current    | 2.5A              |
| 标准放电电流<br>Standard discharge Current | 30A                                | 最大放电电流<br>Maximum Discharge Current | 50A               |
| 放电截止电压<br>Discharge Cut-off Voltage  | 89.6V                              | 尺寸<br>Overall Dimensions (W×D×H)    | 365mm*626mm*261mm |
| 电芯数量<br>Cell Quantity                | 32 PCS                             | 重量<br>Mass                          | 52kg              |
| 电芯容量<br>Cell Capacity                | 50Ah                               | 电芯型号<br>Cell Model                  | CB3914895EA       |
| 电芯生产单位<br>Manufacturer of cell       | 瑞浦能源有限公司<br>Ruipu Energy Co., Ltd. |                                     |                   |



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| 序号<br>No.                          | 测试项目名称<br>Name of test            | 标准要求或标准条款号<br>Stand requirement or the clause number of<br>standard                                 | 测试结果<br>Test result        | 本项结论<br>Test<br>conclusion | 备注<br>Remark |
|------------------------------------|-----------------------------------|---|----------------------------|----------------------------|--------------|
| 1                                  | 高度模拟<br>Altitude simulation       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.1 Test T.1 | 见附表 1<br>See<br>Appendix 1 | 合格<br>Passed               | /            |
| 2                                  | 温度试验<br>Thermal test              | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.2 Test T.2 | 见附表 2<br>See<br>Appendix 2 | 合格<br>Passed               | /            |
| 3                                  | 振动<br>Vibration                   | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.3 Test T.3 | 见附表 3<br>See<br>Appendix 3 | 合格<br>Passed               | /            |
| 4                                  | 冲击<br>Shock                       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.4 Test T.4 | 见附表 4<br>See<br>Appendix 4 | 合格<br>Passed               | /            |
| 5                                  | 外部短路<br>External short<br>circuit | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.5 Test T.5 | 见附表 5<br>See<br>Appendix 5 | 合格<br>Passed               | /            |
| 6                                  | 挤压<br>Crush                       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.6 Test T.6 | 见附表 6<br>See<br>Appendix 6 | 合格<br>Passed               | /            |
| 7                                  | 过度充电<br>Overcharge                | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.7 Test T.7 | 见附表 7<br>See<br>Appendix 7 | 合格<br>Passed               | /            |
| 8                                  | 强制放电<br>Forced discharge          | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验 T.8 Test T.8 | 见附表 8<br>See<br>Appendix 8 | 合格<br>Passed               | /            |
| 测试环境<br>Test environment condition |                                   | 环境温度: 20℃-25℃; 环境湿度: 45%-75%<br>Ambient temperature: 20℃-25℃, Ambient humidity: 45%-75%             |                            |                            |              |





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| 序号<br>No.   | 附表 1<br>Appendix 1  | 测试项目名称<br>Name of test     | 高度模拟<br>Altitude simulation |                            |                          |                            |                     |
|---|---|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|---------------------|
| 标准要求<br>Requirement<br>of Standard  | 试验电池或电池组在压力等于或低于 11.6kPa 和环境温度 20±5℃下存放至少 6h。试验电池或电池组应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池或电池组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组除外）。<br>Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hours at ambient temperature 20±5℃. 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. |                            |                             |                            |                          |                            |                     |
| 样品状态<br>Sample<br>status  | b1#~b2#: 第一个循环完全充电的电池；<br>b1#~b2#: first cycle in fully charged states;<br>b3#~b4#: 第二十五个循环完全充电的电池。<br>b3#~b4#: after 25 cycles ending in fully charged states.   |                            |                             |                            |                          |                            |                     |
| 样品编号<br>Sample No.  | 测试前 Before  |                            | 测试后 After                   |                            | 质量损失<br>Mass loss<br>(%) | 剩余电压<br>Residual<br>OCV(%) | 测试结果<br>Test result |
|   | 电池质量<br>m <sub>1</sub> (kg)   | 开路电压<br>v <sub>1</sub> (V) | 电池质量<br>m <sub>2</sub> (kg) | 开路电压<br>v <sub>2</sub> (V) |                          |                            |                     |
| b1#   | 54.862  | 113.474                    | 54.862                      | 113.474                    | 0.00                     | 100.00                     | O                   |
| b2#   | 54.858  | 113.463                    | 54.858                      | 113.463                    | 0.00                     | 100.00                     | O                   |
| b3#   | 54.870  | 113.469                    | 54.870                      | 113.469                    | 0.00                     | 100.00                     | O                   |
| b4#   | 54.854  | 113.475                    | 54.854                      | 113.475                    | 0.00                     | 100.00                     | O                   |
| 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。<br>Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O- No Leakage, No Venting, No Disassembly, No Rupture & No Fire. |   |                            |                             |                            |                          |                            |                     |



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| 序号<br>No.   | 附表 2<br>Appendix 2   | 测试项目名称<br>Name of test     |                             | 温度试验<br>Thermal test       |                          |                            |                     |
|---|--|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|---------------------|
| 标准要求<br>Requirement<br>of Standard  | 试验大型电池或电池组在试验温度等于 72±2℃下存放至少 12h，接着在试验温度等于-40±2℃下存放至少 12h。两个极端试验温度之间的最大时间间隔为 30min。重复 10 次，再将所有试验电池或电池组在环境温度 20±5℃下存放 24h。试验电池或电池组应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池或电池组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组除外）。<br>Test large cells and batteries are to be stored for at least 12 hours at a test temperature equal to 72±2℃, followed by storage for at least 12 hours at a test temperature equal to -40±2℃. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5℃). 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. |                            |                             |                            |                          |                            |                     |
| 样品状态<br>Sample<br>status  | b1#~b2#: 第一个循环完全充电的电池；<br>b1#~b2#: first cycle in fully charged states;<br>b3#~b4#: 第二十五个循环完全充电的电池。<br>b3#~b4#: after 25 cycles ending in fully charged states.  |                            |                             |                            |                          |                            |                     |
| 样品编号<br>Sample No.  | 测试前 Before   |                            | 测试后 After                   |                            | 质量损失<br>Mass loss<br>(%) | 剩余电压<br>Residual<br>OCV(%) | 测试结果<br>Test result |
|   | 电池质量<br>m <sub>1</sub> (kg)  | 开路电压<br>v <sub>1</sub> (V) | 电池质量<br>m <sub>2</sub> (kg) | 开路电压<br>v <sub>2</sub> (V) |                          |                            |                     |
| b1#   | 54.862   | 113.474                    | 54.862                      | 113.443                    | 0.00                     | 99.97                      | O                   |
| b2#   | 54.858   | 113.463                    | 54.858                      | 113.425                    | 0.00                     | 99.97                      | O                   |
| b3#   | 54.870   | 113.469                    | 54.870                      | 113.428                    | 0.00                     | 99.96                      | O                   |
| b4#   | 54.854   | 113.475                    | 54.854                      | 113.432                    | 0.00                     | 99.96                      | O                   |
| 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。<br>Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O- No Leakage, No Venting, No Disassembly, No Rupture & No Fire. |  |                            |                             |                            |                          |                            |                     |





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| 序号<br>No.  | 附表 3<br>Appendix 3   | 测试项目名称<br>Name of test     |                             | 振动<br>Vibration            |                          |                            |                     |
|--|--|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|---------------------|
| 标准要求<br>Requirement<br>of Standard   | 将大型电池或电池组直接安装或通过夹具安装在振动台的台面上, 用正弦波, 从 7Hz 开始,保持 1g <sub>n</sub> 的最大加速度,直到 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 2g <sub>n</sub> (频率约为 25Hz)。将最大加速度保持在 2g <sub>n</sub> 直到频率增加到 200Hz。对三个互相垂直的电池或电池组安装方向的每个方向重复进行 12 次, 一共振动 3h。试验电池或电池组应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧, 并且每个试验电池或电池组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组除外)。<br>The large 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 from 7Hz to a peak acceleration of 1g <sub>n</sub> 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 2g <sub>n</sub> occurs (approximately 25Hz). A peak acceleration of 2g <sub>n</sub> is then maintained until the frequency is increased to 200Hz. 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. 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. |                            |                             |                            |                          |                            |                     |
| 样品状态<br>Sample<br>status   | b1#~b2#: 第一个循环完全充电的电池;<br>b1#~b2#: first cycle in fully charged states;<br>b3#~b4#: 第二十五个循环完全充电的电池。<br>b3#~b4#: after 25 cycles ending in fully charged states.  |                            |                             |                            |                          |                            |                     |
| 样品编号<br>Sample No.   | 测试前 Before   |                            | 测试后 After                   |                            | 质量损失<br>Mass loss<br>(%) | 剩余电压<br>Residual<br>OCV(%) | 测试结果<br>Test result |
|  | 电池质量<br>m <sub>1</sub> (kg)  | 开路电压<br>v <sub>1</sub> (V) | 电池质量<br>m <sub>2</sub> (kg) | 开路电压<br>v <sub>2</sub> (V) |                          |                            |                     |
| b1#  | 54.862   | 113.443                    | 54.862                      | 113.440                    | 0.00                     | 100.00                     | O                   |
| b2#  | 54.858   | 113.425                    | 54.858                      | 113.425                    | 0.00                     | 100.00                     | O                   |
| b3#  | 54.870   | 113.428                    | 54.870                      | 113.422                    | 0.00                     | 99.99                      | O                   |
| b4#  | 54.854   | 113.432                    | 54.854                      | 113.432                    | 0.00                     | 100.00                     | O                   |
| 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。<br>Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O- No Leakage, No Venting, No Disassembly, No Rupture & No Fire. |  |                            |                             |                            |                          |                            |                     |



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| 序号<br>No.  | 附表 4<br>Appendix 4   |                            | 测试项目名称<br>Name of test      |                            | 冲击<br>Shock              |                            |                     |
|--|--|----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|---------------------|
| 标准要求<br>Requirement<br>of Standard   | 将电池或电池组用坚硬支架紧固在试验装置上, 对于大型电池组, 以加速度为 50g <sub>n</sub> 或 g <sub>n</sub> =√(30000 / mass) 中较小者的正弦波冲击, 脉冲持续时间 11ms, 按三个相互垂直的轴向分别对其正负极各冲击 3 次, 共冲击 18 次。各试验电池或电池组应无重量损失、无渗漏、无排气、无解体、无破裂和无燃烧, 并且每个试验电池或电池组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组除外)。<br>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 Large batteries shall be subjected to a half-sine shock of peak acceleration of 50g <sub>n</sub> or acceleration (g <sub>n</sub> ) =√(30000 / mass) and pulse duration of 11 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. 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) |                            |                             |                            |                          |                            |                     |
| 样品状态<br>Sample<br>status   | b1#~b2#: 第一个循环完全充电的电池;<br>b1#~b2#: first cycle in fully charged states;<br>b3#~b4#: 第二十五个循环完全充电的电池。<br>b3#~b4#: after 25 cycles ending in fully charged states.  |                            |                             |                            |                          |                            |                     |
| 样品编号<br>Sample No.   | 测试前 Before   |                            | 测试后 After                   |                            | 质量损失<br>Mass loss<br>(%) | 剩余电压<br>Residual<br>OCV(%) | 测试结果<br>Test result |
|  | 电池质量<br>m <sub>1</sub> (kg)  | 开路电压<br>v <sub>1</sub> (V) | 电池质量<br>m <sub>2</sub> (kg) | 开路电压<br>v <sub>2</sub> (V) |                          |                            |                     |
| b1#  | 54.862   | 113.440                    | 54.862                      | 113.440                    | 0.00                     | 100.00                     | O                   |
| b2#  | 54.858   | 113.425                    | 54.858                      | 113.425                    | 0.00                     | 100.00                     | O                   |
| b3#  | 54.870   | 113.422                    | 54.870                      | 113.422                    | 0.00                     | 100.00                     | O                   |
| b4#  | 54.854   | 113.432                    | 54.854                      | 113.432                    | 0.00                     | 100.00                     | O                   |
| 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。<br>Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O- No Leakage, No Venting, No Disassembly, No Rupture & No Fire. |  |                            |                             |                            |                          |                            |                     |





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GUANGZHOU CUSTOMS DISTRICT TECHNOLOGY CENTER



中国认可  
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| 序号<br>No.  | 附表 5<br>Appendix 5   | 测试项目名称<br>Name of test | 外部短路<br>External short circuit |
|--|--|------------------------|--------------------------------|
| 标准要求<br>Requirement of Standard  | 待试验电池或电池组的外壳温度稳定在 $57\pm4^{\circ}\text{C}$ 后, 在 $57\pm4^{\circ}\text{C}$ 下使电池或电池组经受总外电阻小于 $0.1\Omega$ 的短路条件, 当电池或电池组外壳温度回到 $57\pm4^{\circ}\text{C}$ 后继续至少 1h, 然后短路断开, 再观察电池或电池组 6h 才结束试验。电池或电池组的外壳温度应不超过 $170^{\circ}\text{C}$ , 并且试验后 6h 内应无解体、无破裂和无燃烧。<br>The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches $57\pm4^{\circ}\text{C}$ and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than $0.1\text{ ohm}$ at $57\pm4^{\circ}\text{C}$ . This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57\pm4^{\circ}\text{C}$ . 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 external temperature does not exceed $170^{\circ}\text{C}$ and there is no disassembly, no rupture and no fire within six hours of this test. |                        |                                |
| 样品状态<br>Sample status  | b1#~b2#: 第一个循环完全充电的电池;<br>b1#~b2#: first cycle in fully charged states;<br>b3#~b4#: 第二十五个循环完全充电的电池。<br>b3#~b4#: after 25 cycles ending in fully charged states.  |                        |                                |
| 样品编号<br>Sample No.   | 样品表面最高温度<br>Max External Temperature( $^{\circ}\text{C}$ )   | 测试结果<br>Test result    | 备注 Remark                      |
| b1#  | 60.5   | O                      | /                              |
| b2#  | 60.2   | O                      | /                              |
| b3#  | 59.7   | O                      | /                              |
| b4#  | 59.4   | O                      | /                              |
| 注: D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。<br>Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire. |  |                        |                                |



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| 序号<br>No.  | 附表 6<br>Appendix 6   | 测试项目名称<br>Name of test |              | 挤压<br>Crush        |   |                     |              |
|--|--|------------------------|--------------|--------------------|---|---------------------|--------------|
| 标准要求<br>Requirement<br>of Standard   | (适用于棱柱形、袋装、硬币/纽扣电池和直径小于 18mm 的圆柱形电池)：<br>将电池或元件电池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 1.5cm/s。挤压持续进行，直到出现以下三种情况之一即解除压力：<br>(a)施加的力量达到 13kN±0.78kN；<br>(b)电池的电压下降至少 100 毫伏；或<br>(c)电池变形量达原始厚度的 50 % 或以上。<br>棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币电池应从其平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。每个电池只做一次挤压试验。<br>试验电池或电池组的组成电芯外部温度不超过 170℃，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。<br>Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 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 1.5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.<br>(a)The applied force reaches 13kN±0.78kN;<br>(b)The voltage of the cell drops by at least 100mV;or<br>(c)The cell is deformed by 50% or more of its original thickness.<br>Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.<br>Each test cell or component cell is to be subjected to one crush only. Cells and component cells meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly and no fire during the test and within six hours after this test. |                        |              |                    |   |                     |              |
|  | 样品状态<br>Sample status<br>C1#~C5#: 第一个循环 50%的额定容量的电芯。<br>C1#~C5#: first cycle at 50% of the design rated capacity of cell.<br>C6#~C10#: 第二十五个循环 50%的额定容量的电芯。<br>C6#~C10#: after 25 cycles at 50% of the design rated capacity of cell.  |                        |              |                    |   |                     |              |
| 样品编号<br>Sample No.   | 样品表面最高温度<br>Max External Temperature(℃)  | 测试结果<br>Test result    | 备注<br>Remark | 样品编号<br>Sample No. | 样品表面最高温度<br>Max External Temperature(℃) | 测试结果<br>Test result | 备注<br>Remark |
| C1#  | 27.2   | O                      | /            | C6#                | 27.5                                    | O                   | /            |
| C2#  | 26.9   | O                      | /            | C7#                | 27.5                                    | O                   | /            |
| C3#  | 26.9   | O                      | /            | C8#                | 27.2                                    | O                   | /            |
| C4#  | 26.8   | O                      | /            | C9#                | 27.5                                    | O                   | /            |
| C5#  | 27.2   | O                      | /            | C10#               | 27.6                                    | O                   | /            |
| 注： D-解体； R-破裂； F-起火； O-无解体、无破裂、无起火。<br>Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire. |  |                        |              |                    |   |                     |              |





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| 序号<br>No.   | 附表 7<br>Appendix 7  | 测试项目名称<br>Name of test | 过度充电<br>Overcharge |
|---|---|------------------------|--------------------|
| 标准要求<br>Requirement<br>of Standard  | <p>充电电流必须是制造商建议的最大连续充电电流的两倍，试验的最小电压应为如下：</p> <p>（a）制造商建议的充电电压不大于 18V 时，试验的最小电压应是电池组最大充电电压的两倍或 22V 两者中的较少者。</p> <p>（b）制造商建议的充电电压大于 18V 时，试验的最小电压应是最大充电电压的 1.2 倍。</p> <p>可再充电电池组在环境温度下试验 24h。试样在试验后 7 天内应无解体和无燃烧。</p> <p>The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:</p> <p>(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.</p> <p>(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.</p> <p>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.</p> |                        |                    |
| 样品状态<br>Sample<br>status  | <p>b5#~b6#： 第一个循环完全充电的电池；<br/>b5#~b6#： first cycle in fully charged states;<br/>b7#~b8#： 第二十五个循环完全充电的电池。<br/>b7#~b8#： after 25 cycles ending in fully charged states.</p>   |                        |                    |
| 样品编号<br>Sample No.  | 测试结果<br>Test result   | 备注<br>Remark           |                    |
| b5#   | O   | /                      |                    |
| b6#   | O   | /                      |                    |
| b7#   | O   | /                      |                    |
| b8#   | O   | /                      |                    |
| <p>注： D-解体； R-破裂； F-起火； O-无解体、无破裂、无起火。</p> <p>Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly. No Rupture &amp; No Fire.</p> |   |                        |                    |



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| 序号<br>No.  | 附表 8<br>Appendix 8   | 测试项目名称<br>Name of test |                    | 强制放电<br>Forced discharge |              |
|--|--|------------------------|--------------------|--------------------------|--------------|
| 标准要求<br>Requirement<br>of Standard   | 试验原电池或可再充电电池在环境温度下与 12V 的直流电源串联，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。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。<br>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 within seven days of the test. |                        |                    |                          |              |
| 样品状态<br>Sample<br>status   | C11#~C20#：第一个循环完全放电的电芯；<br>C11#~C20#: first cycle in fully discharged states;<br>C21#~C30#：第二十五个循环完全放电的电芯。<br>C21#~C30#: after 25 cycles in fully discharged states.   |                        |                    |                          |              |
| 样品编号<br>Sample No.   | 测试结果<br>Test result  | 备注<br>Remark           | 样品编号<br>Sample No. | 测试结果<br>Test result      | 备注<br>Remark |
| C11#   | O  | /                      | C21#               | O                        | /            |
| C12#   | O  | /                      | C22#               | O                        | /            |
| C13#   | O  | /                      | C23#               | O                        | /            |
| C14#   | O  | /                      | C24#               | O                        | /            |
| C15#   | O  | /                      | C25#               | O                        | /            |
| C16#   | O  | /                      | C26#               | O                        | /            |
| C17#   | O  | /                      | C27#               | O                        | /            |
| C18#   | O  | /                      | C28#               | O                        | /            |
| C19#   | O  | /                      | C29#               | O                        | /            |
| C20#   | O  | /                      | C30#               | O                        | /            |
| 注： D-解体； R-破裂； F-起火； O-无解体、无破裂、无起火。<br>Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire. |  |                        |                    |                          |              |



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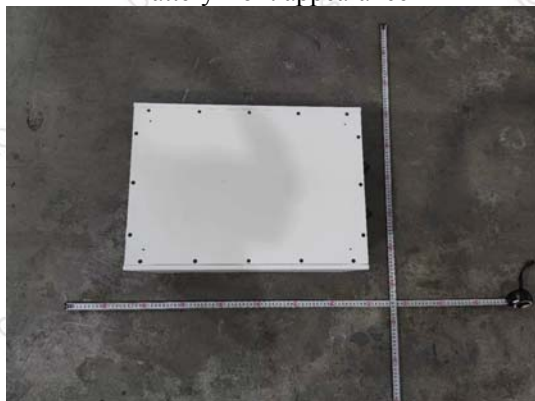
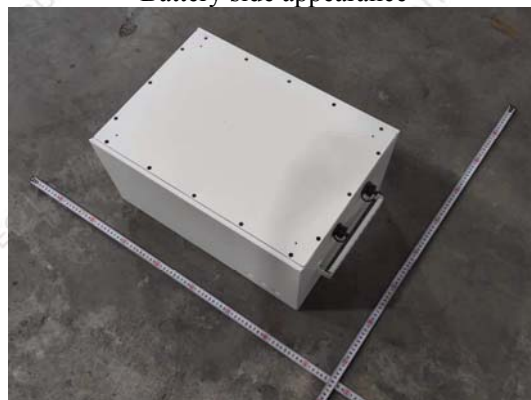
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## 样品图片

## Photo of the sample

电池正面外观  
Battery front appearance电池侧面外观  
Battery side appearance电池铭牌(含 Wh)  
Battery nameplate (With Wh)**SAJ** Guangzhou Sanjing Electric Co., Ltd.  
Tel: +8620-88028888 Fax: +8620-88028888  
Web: www.saj-electric.com Email: sanjing@saj-electric.com

## Rechargeable Li-ion Battery Module

Type: BU2-5.0-HV5

|                          |               |
|--------------------------|---------------|
| Battery Type             | Lithium-ion   |
| Total Energy Capacity    | 5.0kWh        |
| Rated Voltage            | 102.4Vdc      |
| Voltage Range            | 89.6~115.2Vdc |
| Max. charging Current    | 30A dc        |
| Max. Discharging Current | 30A dc        |
| Ingress Protection       | IP65          |
| Protective Class         | I             |
| Permitted Humidity       | 0~95%         |
| Charging Temperature     | 0℃~50℃        |
| Discharging Temperature  | -10℃~50℃      |

\*Do not subject the battery to any strong force.  
\*Do not disassemble the battery.  
\*Do not short circuit the battery.  
\*Do not place the battery near a heat source.



S/N

P/C

Importer:

MADE IN CHINA

电芯  
Cell电芯标签  
Cell label



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## 声明 Statement

1. 本报告无检测单位公章无效。

The test report is invalid without the official stamp of IQTC.

2. 本报告无批准人、审核人及主检人签名无效。

The test report is invalid without the signatures of Approver, Checker and Appraiser.

3. 本报告涂改无效。未经本实验室书面同意, 不得部分地复制本报告。

The test report is invalid if altered. Nobody is allowed to photocopy or partly photocopy this report without written permission of IQTC.

4. 客户必须如实提供样品及资料, 并保证申报品名和样品以及运输货物相同, 否则本检测单位不承担任何相关责任。

The client should provide samples and relevant data, at the same time, they should guarantee the consistence of the product's name they declared, the samples they provided and the goods to be transported. Otherwise we will not bear any relevant responsibilities.

5. 对检测报告若有异议, 应于收到报告之日起十五天内向检测单位提出。

Objection to the test report must be submitted to IQTC within 15 days

6. 本报告仅对送检样品负责。

The test report is valid for the tested samples only.

7. 检测地址: 广东省广州市科学城南翔支路1号C102房(汽车与装备检测研究所科学城)

Test Address: Room C102, No.1 Nanxiangzhi Road, Science City, Guangzhou, Guangdong, China  
(Institute of Automobile and Equipment Testing in Science City)

电话(Tel): 020-38669019-811

电子邮箱(E-mail): [battery@iqtcnet.cn](mailto:battery@iqtcnet.cn)

\* \* \* \* 报告结束 End of report \* \* \* \*