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网址：www.iqtc.cn 邮编：510623

Add: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, China

Website: www.iqtc.cn Postcode: 510623

No: 01052000000313-1(E)

Date: 2020-01-20

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## UN38.3 报告

### UN38.3 Test Report

样品名称： 锂离子电池

Sample Name: Lithium Ion Cell

委托单位： 湖北亿纬动力有限公司

Applicant: EVE POWER Co., Ltd.



广州海关技术中心

GUANGZHOU CUSTOMS DISTRICT TECHNOLOGY CENTER



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检测  
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## 检测证书

### TEST REPORT

|                                        |                                                                                                                                                                                                                                                             |                   |                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|
| 样品名称<br>Sample Name                    | 锂离子电池<br>Lithium Ion Cell                                                                                                                                                                                                                                   |                   |                       |
| 型号<br>Model                            | LF50K                                                                                                                                                                                                                                                       |                   |                       |
| 委托单位<br>Applicant                      | 湖北亿纬动力有限公司<br>EVE POWER Co., Ltd.                                                                                                                                                                                                                           |                   |                       |
| 委托单位地址<br>Applicant Address            | 湖北省荆门市高新区•掇刀区荆南大道 68 号<br>No.68, Jingnan Avenue High-Tech Zone, Duodao District, Jingmen City, Hubei Province, P.R. China                                                                                                                                   |                   |                       |
| 生产单位<br>Manufacture                    | 湖北亿纬动力有限公司<br>EVE POWER Co., Ltd.                                                                                                                                                                                                                           |                   |                       |
| 生产单位地址<br>Manufacture Address          | 湖北省荆门市高新区•掇刀区荆南大道 68 号<br>No.68, Jingnan Avenue High-Tech Zone, Duodao District, Jingmen City, Hubei Province, P.R. China                                                                                                                                   |                   |                       |
| 样品外观与性状<br>Appearance & Odor           | 蓝色和白色塑料外壳<br>Blue and White Plastic 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.6/Amend.1, 38.3<br>UNITED NATIONS “Recommendations on the TRANSPORT OF DANGEROUS GOODS”, Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1, 38.3                                                        |                   |                       |
| 接样时间<br>Accepted date                  | 2019-05-05                                                                                                                                                                                                                                                  | 测试日期<br>Test date | 2019-05-06~2019-05-30 |
| 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、强制放电。<br>Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Crush, 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.6/Amend.1, 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.6/Amend.1, 38.3. |                   |                       |
| 备注<br>Remark                           | 1.检测结果仅对样品有效；<br>The test results are only valid for the test samples submitted the applicant.<br>2.随附 UN38.3 试验概要（编号：01052000000313-2(E)）。<br>Attached with UN38.3 test summary (No.: 01052000000313-2(E)).                                                |                   |                       |

批准

Approver:

审核

Checker:

主检

Appraiser:

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电池信息：

The battery information:

|                                      |                                   |                                     |               |
|--------------------------------------|-----------------------------------|-------------------------------------|---------------|
| 电池类型<br>Battery type                 | 锂离子电池<br>Lithium ion batteries    | 标称电压<br>Nominal Voltage             | 3.20V         |
| 额定容量<br>Rated Capacity               | 50Ah                              | 总能量<br>Total Energy                 | 160 Wh        |
| 充电限制电压<br>Limited Charge Voltage     | 3.65 V                            | 标准充电电流<br>Standard Charge Current   | 25A           |
| 最大充电电流<br>Maximum Charge Current     | 150 A                             | 充电截止电流<br>Charge Cut-off Current    | 2.50 A        |
| 标准放电电流<br>Standard discharge Current | 25 A                              | 最大放电电流<br>Maximum Discharge Current | 150 A         |
| 放电截止电压<br>Discharge Cut-off Voltage  | 2.50 V                            | 物理形状说明<br>Physical description      | 长方体<br>Cuboid |
| 电芯数量<br>Cell Quantity                | 1 PCS                             | 重量<br>Mass                          | 1395 g        |
| 电芯容量<br>Cell Capacity                | 50 Ah                             | 电芯型号<br>Cell Model                  | LF50K         |
| 电芯生产单位<br>Manufacturer of cell       | 湖北亿纬动力有限公司<br>EVE POWER 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 standard                                            | 测试结果<br>Test result     | 本项结论<br>Test conclusion | 备注<br>Remark |
|----------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|--------------|
| 1                                      | 高空模拟<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.6/Amend.1, 38.3 试验 T.1 Test T.1 | 见附表 1<br>See 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.6/Amend.1, 38.3 试验 T.2 Test T.2 | 见附表 2<br>See 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.6/Amend.1, 38.3 试验 T.3 Test T.3 | 见附表 3<br>See 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.6/Amend.1, 38.3 试验 T.4 Test T.4 | 见附表 4<br>See Appendix 4 | 合格<br>Passed            | /            |
| 5                                      | 外部短路<br>External short 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.6/Amend.1, 38.3 试验 T.5 Test T.5 | 见附表 5<br>See 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.6/Amend.1, 38.3 试验 T.6 Test T.6 | 见附表 6<br>See 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.6/Amend.1, 38.3 试验 T.7 Test T.7 | 见附表 7<br>See Appendix 7 | 不适用<br>Not applicable   | /            |
| 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.6/Amend.1, 38.3 试验 T.8 Test T.8 | 见附表 8<br>See 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%                        |                         |                         |              |
| 分包测试情况<br>Subcontracted test condition |                                | 测试项目<br>Test items                                                                                          | /                       |                         |              |
|                                        |                                | 分包实验室<br>Subcontracted Laboratory                                                                           | 名称<br>Name              | 邮编<br>Post code         | /            |
|                                        |                                |                                                                                                             | 地址<br>Address           | 电话<br>Tel               | /            |

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| 序号<br>No.                                                                                                                                                                                | 附表 1<br>Appendix 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 测试项目名称<br>Name of test     | 高空模拟<br>Altitude simulation |                            |                       |                         |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------|----------------------------|-----------------------|-------------------------|---------------------|
| 标准要求<br>Requirement 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 11.6 kPa or less for at least six hours at ambient temperature 20 ± 5 °C. Cells and batteries meet this requirement if there is no 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 status                                                                                                                                                                    | C1#~C5#: 第一个循环完全充电的电池；<br>C1#~C5#: first cycle in fully charged states.<br>C6#~C10#: 第二十五个循环完全充电的电池。<br>C6#~C10#: 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 (%) | 剩余电压<br>Residual OCV(%) | 测试结果<br>Test result |
|                                                                                                                                                                                          | 电池质量<br>m <sub>1</sub> (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 开路电压<br>v <sub>1</sub> (v) | 电池质量<br>m <sub>2</sub> (g)  | 开路电压<br>v <sub>2</sub> (v) |                       |                         |                     |
| C1#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.435                      | 1399.7                      | 3.435                      | 0.00                  | 100.00                  | O                   |
| C2#                                                                                                                                                                                      | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.432                      | 1400.1                      | 3.432                      | 0.00                  | 100.00                  | O                   |
| C3#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.436                      | 1399.6                      | 3.436                      | 0.00                  | 100.00                  | O                   |
| C4#                                                                                                                                                                                      | 1399.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.432                      | 1399.8                      | 3.432                      | 0.00                  | 100.00                  | O                   |
| C5#                                                                                                                                                                                      | 1400.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.435                      | 1400.2                      | 3.435                      | 0.00                  | 100.00                  | O                   |
| C6#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.435                      | 1399.7                      | 3.435                      | 0.00                  | 100.00                  | O                   |
| C7#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.437                      | 1399.6                      | 3.437                      | 0.00                  | 100.00                  | O                   |
| C8#                                                                                                                                                                                      | 1399.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.436                      | 1399.5                      | 3.436                      | 0.00                  | 100.00                  | O                   |
| C9#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.437                      | 1399.7                      | 3.437                      | 0.00                  | 100.00                  | O                   |
| C10#                                                                                                                                                                                     | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.435                      | 1400.1                      | 3.435                      | 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 of Standard                                                                                                                                                          | 试验电池或电池组在试验温度等于 72℃ ±2℃ 下存放至少 6h，接着在试验温度等于-40℃ ±2℃ 下存放至少 6h（大型电池或电池组暴露于极端试验温度的时间至少为 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 cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ± 2 ℃, followed by storage for at least six 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 ℃.). 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 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 status                                                                                                                                                                    | C1#~C5#：第一个循环完全充电的电池；<br>C1#~C5#： first cycle in fully charged states.<br>C6#~C10#：第二十五个循环完全充电的电池。<br>C6#~C10#： 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 (%) | 剩余电压<br>Residual OCV(%) | 测试结果<br>Test result |
|                                                                                                                                                                                          | 电池质量<br>m <sub>1</sub> (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 开路电压<br>v <sub>1</sub> (v) | 电池质量<br>m <sub>2</sub> (g) | 开路电压<br>v <sub>2</sub> (v) |                       |                         |                     |
| C1#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.435                      | 1399.7                     | 3.362                      | 0.00                  | 97.87                   | O                   |
| C2#                                                                                                                                                                                      | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.432                      | 1400.1                     | 3.361                      | 0.00                  | 97.93                   | O                   |
| C3#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.436                      | 1399.6                     | 3.354                      | 0.00                  | 97.61                   | O                   |
| C4#                                                                                                                                                                                      | 1399.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.432                      | 1399.7                     | 3.349                      | 0.01                  | 97.58                   | O                   |
| C5#                                                                                                                                                                                      | 1400.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.435                      | 1400.2                     | 3.368                      | 0.00                  | 98.05                   | O                   |
| C6#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.435                      | 1399.7                     | 3.349                      | 0.00                  | 97.50                   | O                   |
| C7#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.437                      | 1399.5                     | 3.345                      | 0.01                  | 97.32                   | O                   |
| C8#                                                                                                                                                                                      | 1399.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.436                      | 1399.5                     | 3.356                      | 0.00                  | 97.67                   | O                   |
| C9#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.437                      | 1399.6                     | 3.347                      | 0.01                  | 97.38                   | O                   |
| C10#                                                                                                                                                                                     | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.435                      | 1400.1                     | 3.355                      | 0.00                  | 97.67                   | 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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地址：中国广州市天河区珠江新城花城大道66号B座

网址：www.iqtc.cn 邮编：510623

Add: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, China

Website: www.iqtc.cn Postcode: 510623

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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，频率在 7Hz 和 200Hz 之间摆动再回到 7Hz 的对数扫频 15min，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>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. 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                                                                                                                                                                 | C1#~C5#： 第一个循环完全充电的电池；<br>C1#~C5#： first cycle in fully charged states.<br>C6#~C10#： 第二十五个循环完全充电的电池。<br>C6#~C10#： 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> (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 开路电压<br>v <sub>1</sub> (v) | 电池质量<br>m <sub>2</sub> (g) | 开路电压<br>v <sub>2</sub> (v) |                          |                            |                     |
| C1#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.362                      | 1399.3                     | 3.362                      | 0.03                     | 100.00                     | O                   |
| C2#                                                                                                                                                                                      | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.361                      | 1399.8                     | 3.361                      | 0.02                     | 100.00                     | O                   |
| C3#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.354                      | 1399.5                     | 3.354                      | 0.01                     | 100.00                     | O                   |
| C4#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.349                      | 1399.4                     | 3.349                      | 0.02                     | 100.00                     | O                   |
| C5#                                                                                                                                                                                      | 1400.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.368                      | 1400                       | 3.368                      | 0.01                     | 100.00                     | O                   |
| C6#                                                                                                                                                                                      | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.349                      | 1399.4                     | 3.349                      | 0.02                     | 100.00                     | O                   |
| C7#                                                                                                                                                                                      | 1399.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.345                      | 1399.2                     | 3.345                      | 0.02                     | 100.00                     | O                   |
| C8#                                                                                                                                                                                      | 1399.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.356                      | 1399.4                     | 3.356                      | 0.01                     | 100.00                     | O                   |
| C9#                                                                                                                                                                                      | 1399.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.347                      | 1399.2                     | 3.347                      | 0.03                     | 100.00                     | O                   |
| C10#                                                                                                                                                                                     | 1400.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.355                      | 1399.7                     | 3.355                      | 0.03                     | 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，对于小型电池组，应以加速度为 150gn 或 $gn=\sqrt{(100850 / mass)}$ 中较小者的正弦波冲击，脉冲持续时间 6ms，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 small batteries shall be subjected to a half-sine shock of peak acceleration of 150gn or acceleration (gn) = $\sqrt{(100850 / mass)}$ 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. 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 expressed in kilograms) |                            |                            |                            |                          |                            |                     |
| 样品状态<br>Sample<br>status                                                                                                                                                                | C1#~C5#: 第一个循环完全充电的电池；<br>C1#~C5#: first cycle in fully charged states.<br>C6#~C10#: 第二十五个循环完全充电的电池。<br>C6#~C10#: 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> (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 开路电压<br>v <sub>1</sub> (v) | 电池质量<br>m <sub>2</sub> (g) | 开路电压<br>v <sub>2</sub> (v) |                          |                            |                     |
| C1#                                                                                                                                                                                     | 1399.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.362                      | 1399.3                     | 3.362                      | 0.00                     | 100.00                     | O                   |
| C2#                                                                                                                                                                                     | 1399.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.361                      | 1399.8                     | 3.361                      | 0.00                     | 100.00                     | O                   |
| C3#                                                                                                                                                                                     | 1399.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.354                      | 1399.4                     | 3.354                      | 0.01                     | 100.00                     | O                   |
| C4#                                                                                                                                                                                     | 1399.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.349                      | 1399.4                     | 3.349                      | 0.00                     | 100.00                     | O                   |
| C5#                                                                                                                                                                                     | 1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.368                      | 1400                       | 3.368                      | 0.00                     | 100.00                     | O                   |
| C6#                                                                                                                                                                                     | 1399.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.349                      | 1399.4                     | 3.349                      | 0.00                     | 100.00                     | O                   |
| C7#                                                                                                                                                                                     | 1399.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.345                      | 1399.2                     | 3.345                      | 0.00                     | 100.00                     | O                   |
| C8#                                                                                                                                                                                     | 1399.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.356                      | 1399.2                     | 3.356                      | 0.01                     | 100.00                     | O                   |
| C9#                                                                                                                                                                                     | 1399.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.347                      | 1399.2                     | 3.347                      | 0.00                     | 100.00                     | O                   |
| C10#                                                                                                                                                                                    | 1399.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.355                      | 1399.7                     | 3.355                      | 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 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 $57 \pm 4^{\circ}\text{C}$ 后，在 $57 \pm 4^{\circ}\text{C}$ 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 $57 \pm 4^{\circ}\text{C}$ 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 $57 \pm 4^{\circ}\text{C}$ 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 $57 \pm 4^{\circ}\text{C}$ . This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57 \pm 4^{\circ}\text{C}$ . 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                                                                                              | C1#~C5#: 第一个循环完全充电的电池；<br>C1#~C5#: first cycle in fully charged states.<br>C6#~C10#: 第二十五个循环完全充电的电池。<br>C6#~C10#: 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                      |
| C1#                                                                                                                | 98.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C2#                                                                                                                | 97.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C3#                                                                                                                | 97.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C4#                                                                                                                | 103.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | O                      | /                              |
| C5#                                                                                                                | 98.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C6#                                                                                                                | 96.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C7#                                                                                                                | 97.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /                              |
| C8#                                                                                                                | 100.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | O                      | /                              |
| C9#                                                                                                                | 102.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | O                      | /                              |
| C10#                                                                                                               | 106.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 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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地址：中国广州市天河区珠江新城花城大道66号B座

网址：www.iqtc.cn 邮编：510623

Add: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, China

Website: www.iqtc.cn Postcode: 510623

No: 01052000000313-1(E)

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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 of Standard                                                                                        | <p>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 )：</p> <p>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：</p> <p>(a)施加的力量达到 13kN±0.78kN；</p> <p>(b)电池的电压下降至少 100mV；或</p> <p>(c)电池变形达原始厚度的 50 % 或以上。</p> <p>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。圆柱形电池应与纵轴垂直的方向施压。每个电池只做一次挤压试验。</p> <p>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。</p> <p>Crush(applicable to prismatic, pouch, coin/button cells and cylindrical cells less 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. (a)The applied force reaches 13kN±0.78kN;</p> <p>(b)The voltage of the cell drops by at least 100mV;or</p> <p>(c)The cell is deformed by 50% or more of its original thickness.</p> <p>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.</p> <p>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 °C and there is no disassembly and no fire during the test and within six hours after this test.</p> |                        |              |                    |                                         |                     |              |
| 样品状态<br>Sample status                                                                                                  | <p>C11#~C15#: 第一个循环 50%的额定容量的电芯。</p> <p>C11#~C15#: first cycle at 50% of the design rated capacity of cell.</p> <p>C16#~C20#: 第二十五个循环 50%的额定容量的电芯。</p> <p>C16#~C20#: after 25 cycles at 50% of the design rated capacity of cell.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                        |              |                    |                                         |                     |              |
| 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 |
| C11#                                                                                                                   | 43.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /            | C16#               | 53.3                                    | O                   | /            |
| C12#                                                                                                                   | 46.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /            | C17#               | 49.5                                    | O                   | /            |
| C13#                                                                                                                   | 44.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /            | C18#               | 52.1                                    | O                   | /            |
| C14#                                                                                                                   | 51.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /            | C19#               | 56.2                                    | O                   | /            |
| C15#                                                                                                                   | 53.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | O                      | /            | C20#               | 47.4                                    | 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 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                                                                                                              | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| 样品编号<br>Sample No.                                                                                                                    | 测试结果<br>Test result                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 备注<br>Remark                                                                                                                                                                                                                                                                                                                           |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>未安装过度充电保护装置、按设计要求只能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，无需满足本项试验的要求。</p> <p>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 subject to the requirements of this test.</p> |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| /                                                                                                                                     | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                        |                    |
| <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 12 V 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                                                                                               | C21#~C30#：第一个循环完全放电的电芯；<br>C21#~C30#： first cycle in fully discharged states;<br>C31#~C40#：第二十五个循环完全放电的电芯。<br>C31#~C40#： 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 |
| C21#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C31#               | O                        | /            |
| C22#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C32#               | O                        | /            |
| C23#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C33#               | O                        | /            |
| C24#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C34#               | O                        | /            |
| C25#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C35#               | O                        | /            |
| C26#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C36#               | O                        | /            |
| C27#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C37#               | O                        | /            |
| C28#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C38#               | O                        | /            |
| C29#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C39#               | O                        | /            |
| C30#                                                                                                                   | O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | /                      | C40#               | 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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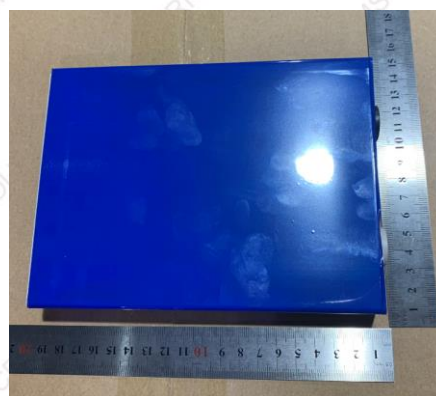
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### 样品图片

### Photo of the sample

#### 电芯/Cell



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- 1.本报告无检验单位公章无效。

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.

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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.

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

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The test report is valid for the tested samples only.

- 7.检验地址：广东省广州市科学城南翔支路1号C102房（轻工科学城实验室）

Inspection Address: Room C102, No.1 Nanxiangzhi Road, Science City, Guangzhou, Guangdong, China (Light Industry Testing Laboratory in Science City)

电话(Tel): 020-38669019

电子邮箱(E-mail): itl@iqtc.cn

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