

# 广州海关技术中心







01112200001656-1(E)

Date: 2022-06-30 Add.: Tower B, No.66 Huacheng Avenue, Zhujiang Kincheng, Tianhe District, Guangzhou, Guangdong, P.R.C. Page:

# UN38.3 报告 **UN38.3 Test Report**

磷酸铁锂电池

LITHIUM IRON PHOSPHATE BATTERY Sample Name:

广州菲利斯太阳能科技有限公司 委托单位:

Guangzhou Felicity Solar Technology Co., Ltd Applicant:

广州海关技术 GUANGZHOU CUSTOMS DISTRICT TE

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## **GUANGZHOU CUSTOMS DISTRICT TECHNOLOGY CENTER**

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Date: 2022-06-30 2 of 14

Add.: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, Guangdong, P.R.C. Page: 电话Tel: 020-22131000 邮箱Email: ppdc@iqtcnet.cn 网址Website: https://www.iqtcnet.cn

## 检测证书

## TEST REPORT

| , 0                                       | TEST REPORT   |
|---|---|
| 样品名称                                      | 磷酸铁锂电池  |
| Sample Name                               | LITHIUM IRON PHOSPHATE BATTERY  |
| 型号<br>Model                               | LPBA48100-OL  |
| 委托单位                                      | 广州菲利斯太阳能科技有限公司  |
| Applicant                                 | Guangzhou Felicity Solar Technology Co., Ltd  |
| 委托单位地址                                    | 广东省广州市白云区人和镇东华工业区东华兴富街 23 号   |
| Applicant Address                         | No.23, xingfu street, renhe town, baiyun district, guangzhou, Guangdong   |
| 生产单位                                      | 广州菲利斯太阳能科技有限公司  |
| Manufacture                               | Guangzhou Felicity Solar Technology Co., Ltd  |
| 生产单位地址                                    | 广东省广州市白云区人和镇东华工业区东华兴富街 23 号   |
| Manufacture Address                       | No.23, xingfu street, renhe town, baiyun district, guangzhou, Guangdong   |
| 样品外观与性状                                   | 白色金属外壳  |
| Appearance & Odor                         | white metal shell   |
| 测试方法和判定标准<br>Test method and<br>criterion | 联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11/Rev.7, 38.3 UNITED NATIONS" Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3   |
| 接样时间                                      | 2022-05-23 测试日期   |
| Accepted date                             | Test date 2022-05-23~2022-06-25   |
| 测试项目<br>Test items                        | 高度模拟、温度试验、振动、冲击、外部短路、挤压、过度充电、强制放电。<br>Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Crush, Overcharg<br>Forced discharge.  |
| 结论<br>Conclusion                          | 经测试,该样品符合联合国《关于危险货废产输的建议书文试验和标准手册)<br>ST/SG/AC.10/11/Rev.7, 38.3 标准要求。<br>The sample has passed the test items of UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOOD!" 位 M 可以 Test and Criter ST/SG/AC.10/11/Rev.7, 38.3. |
| 备注  | 1.随附 UN38.3 试验概要(编号: 01052100001656-2(E))。  |
| Remark                                    | Attached with UN38.3 test summary (No.: 01052100001656-2(E)).   |

批准

Approver:

审核

Checker: 好和吃

主检

Appraiser:

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## 电池组信息:

## The batteries information:

| 电池类型<br>Battery type                 | 锂离子电池组<br>Lithium ion batteries | 标称电压<br>Nominal Voltage                                  | 51.2 V               |
|--------------------------------------|---------------------------------|--|----------------------|
| 额定容量<br>Rated Capacity               | 100Ah                           | 总能量<br>Total Energy                                      | 5120Wh               |
| 充电限制电压<br>Limited Charge Voltage     | 57.6V                           | 标准充电电流<br>Standard Charge Current                        | 50A                  |
| 最大充电电流<br>Maximum Charge Current     | 100A(10S)                       | 充电截止电流<br>Charge Cut-off Current                         | TOME DIST            |
| 标准放电电流<br>Standard discharge Current | 50A                             | 最大放电电流<br>Maximum Discharge<br>Current                   | 50A                  |
| 放电截止电压<br>Discharge Cut-off Voltage  | 48V                             | 物理形状说明<br>Physical description                           | 长方体<br><u>Cuboid</u> |
| 电芯数量<br>Cell Quantity                | 16 PCS                          | 重量<br>Mass   | 50.5±2kg             |
| 电芯容量<br>Cell Capacity                | 100Ah                           | 电芯型号<br>Cell Model                                       | L160F100A            |
| 电芯生产单位<br>Manufacturer of cell       | and the same of                 | <sup>上</sup> 州菲利斯太阳能科技有限<br>zhou Felicity Solar Technolo |                      |

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地址:中国广东省广州市天河区珠江新城花城大道66号B座 邮编Postcode: 510623 Add.: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, Guangdong, P.R.C. Page: 4 of 14

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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 Stand requirement or the clause number of standard                                      | 测试结果<br>Test result        | 本项结论<br>Test<br>conclusion | 备注<br>Remark |
|-----------|-----------------------------------|--|----------------------------|----------------------------|--------------|
| KECHING   | 高度模拟<br>Altitude simulation       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.1 Test T.1 | 见附表 1<br>See<br>Appendix 1 | 合格<br>Passed               | /            |
| 2,0       | 温度试验<br>Thermal test              | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.2 Test T.2 | 见附表 2<br>See<br>Appendix 2 | 合格<br>Passed               | TECHNO!      |
| 3         | 振动<br>Vibration                   | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.3 Test T.3 | 见附表 3<br>See<br>Appendix 3 | 合格<br>Passed               | HOLORE       |
| 5 4       | 冲击<br>Shock                       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.4 Test T.4 | 见附表 4<br>See<br>Appendix 4 | 合格<br>Passed               | 1            |
| 5015      | 外部短路<br>External short<br>circuit | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.5 Test T.5 | 见附表 5<br>See<br>Appendix 5 | 合格<br>Passed               | oct of       |
| 6         | 挤压<br>Crush                       | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.6 Test T.6 | 见附表 6<br>See<br>Appendix 6 | 合格<br>Passed               | TONEDIST     |
| 7         | 过度充电<br>Overcharge                | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.7 Test T.7 | 见附表 7<br>See<br>Appendix 7 | 合格<br>Passed               | , 3          |
| 8         | 强制放电<br>Forced discharge          | 联合国《关于危险货物运输的建议书 试验和标准手册》UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7, 38.3 试验T.8 Test T.8 | 见附表 8<br>See<br>Appendix 8 | 合格<br>Passed               |              |
| Test e    | 测试环境<br>environment condition     | 环境温度: 20℃-25℃; 环<br>Ambient temperature: 20℃-25℃, A  |                            |                            | (RICT TV     |

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| 序号<br>No.                          |  | 附表 1<br>pendix 1   | KECK NE  | 测试项目名称<br>Name of test  | CUSTOMS  | 高度模<br>Altitude sim   |  |
|------------------------------------|--|--|--|---|--|---|--|
| 标准要求<br>Requirement<br>of Standard | 池组应无重量<br>在试验后的开<br>组除外 )。<br>Test cells and l<br>temperature 20<br>venting, no dis<br>battery after tes | 池组在压力等员<br>损失、无渗漏、<br>路电压不少于与<br>batteries shall be<br>≥5℃. Cells and<br>assembly, no rup<br>sting is not less to<br>lating to voltage | 无排气、无触<br>ta进行这一位<br>stored at a pres<br>batteries meet of<br>pture and no fire<br>than 90% of its | 解体、无破裂积<br>就验前电压的的<br>ssure of 11.6kF<br>this requirement<br>and if the open<br>voltage immed | 印无燃烧,并」<br>90%(完全放 bear or less for at there is no en circuit voltagitately prior to t | 且每个试验电影<br>电状态的试验的<br>least six hours<br>mass loss, no loge of each test of<br>his procedure. | 他或电池组<br>电池或电池<br>at ambient<br>eakage, no<br>cell or<br>The |
| 样品状态<br>Sample<br>status           | b1#~b2#: firs<br>b3#~b4#: 第二   | 一个循环完全充<br>st cycle in fully c<br>二十五个循环完<br>er 25 cycles end  | charged states;<br>全充电的电池  |   | DISTR. METHON  | justonis <sub>GUP</sub>   | McThono  |
| 样品编号                               | 测试前  | Before   | 测试后  | After   | 质量损失   | 剩余电压  | 测试结果   |
| 写如细号<br>Sample No.                 | 电池质量<br>m <sub>I</sub> (kg)  | 开路电压<br>V <sub>I</sub> (V)   | 电池质量<br>m <sub>2</sub> (kg)  | 开路电压<br>V2(V)   | Mass loss<br>(%)   | Residual<br>OCV(%)  | 测试结果<br>Test result  |
| b1#                                | 47.470   | 53.3   | 47.470   | 53.3  | 0.00   | 100.00  | 9015   |
| b2#                                | 47.472   | 53.1   | 47.472   | 53.1  | 0.00   | 100.00  | 50   |
| b3#                                | 47.474   | 53.4   | 47.474   | 53.4  | 0.00   | 100.00  | 0 6  |
| b4#                                | 47.472   | 53.3   | 47.472   | 53.3  | 0.00   | 100.00  | О  |

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。 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.                          |  | 表 2<br>endix 2   |   | l试项目名称<br>Name of test  | JSTOMS  | 温度试明<br>Thermal t  |   |
|------------------------------------|--|--|---|---|---|--|---|
| 标准要求<br>Requirement<br>of Standard | 下存放至少 1. 验电池或电池<br>无排气、无解<br>其在进行这一<br>Test large cells<br>72±2℃, follow<br>maximum time<br>repeated 10 tin<br>temperature (2)<br>no venting, no<br>battery after test | 2h。两个极端让组在环境温度体、无破裂和试验前电压的sand batteries and betweenes, after which 0±5℃). Cells and disassembly, no sting is not less | 验温度等于 72:<br>式验温度之间的<br>20±5℃下存放<br>无燃烧,并且每<br>90%(完全放<br>re to be stored for at least 12 ho<br>en test temperate<br>all test cells and<br>nd batteries mee<br>o rupture and no<br>than 90% of its<br>e is not applicab | 可最大时间间隔<br>24h。试验电池<br>每个试验电池或<br>电状态的试验<br>or at least 12 hours at a test ten<br>ure extremes is<br>d batteries are t<br>et this requirem<br>of fire and if the<br>voltage immed | 局为 30min。<br>地或电池组在试<br>电池或电池组在试<br>电池或电池组<br>ours at a test to<br>nperature equa<br>30 minutes. To<br>be stored for<br>ent if there is<br>open circuit v<br>liately prior to | 重复 10 次,再<br>无重量损失、<br>验后的开路电<br>1除外)。<br>emperature equal to -40±2℃.<br>This procedure<br>r 24 hours at ar<br>no mass loss, noltage of each<br>this procedure | 将所有试<br>无渗漏、<br>压不少于<br>nal to<br>The<br>is to be<br>mbient<br>oo leakage,<br>test cell or<br>. The |
| 样品状态<br>Sample<br>status           | b1#~b2#: firs<br>b3#~b4#: 第二   |  |   |   | CAMETHO   | (E)  | OCY CEPTIFE   |
| +¥ 口 <i>位</i> 日                    | 测试前  | Before   | 测试后   | After   | 质量损失  | 剩余电压   | 测计计用  |
| 样品编号<br>Sample No.                 | 电池质量<br>m <sub>l</sub> (kg)  | 开路电压<br>Vı(V)  | 电池质量<br>m <sub>2</sub> (kg)   | 开路电压<br>V <sub>2</sub> (V)  | Mass loss<br>(%)  | Residual<br>OCV(%)   | 测试结果<br>Test result   |
| b1#                                | 47.470   | 53.3   | 47.470  | 53.0  | 0.00  | 99.44  | О   |
| b2#                                | 47.472   | 53.1   | 47.468  | 52.6  | 0.01  | 99.06  | 0   |
| b3#                                | 47.474   | 53.4   | 47.472  | 53.1  | 0.00  | 99.44  | <i>&amp;</i> 0  |
| b4#                                | 47.472   | 53.3   | 47.468  | 52.7  | 0.01  | 98.87  | 0   |
|                                    | -42  |  | _   |   | 775   |  |   |

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。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.                          |   | 付表 3<br>pendix 3  | (TECT)   | 测试项目名称<br>Name of test   | sustoms t  | 振动<br>Vibrat   |   |
|------------------------------------|---|---|--|--|--|--|---|
| 标准要求<br>Requirement<br>of Standard | 1gn 的最大加速速度达到 2gn(的电池或电池损失、无渗漏电压不少于其The large Cells distorting the c sinusoidal wavuntil 18Hz is refrequency increof 2gn is then n times for a tota of the direction requirement if if the open circ immediately prand batteries at | 速度,直到 18Hz<br>频率约为 25Hz<br>组安装方向的<br>、无排气、无疑<br>and batteries a<br>ells in such a me<br>form with a lo<br>eached. The ame<br>eased until a penaintained until<br>l of 3 hours for<br>us of vibration mand<br>there is no mass<br>uit voltage of e<br>ior to this process<br>fully discharge | $e_{\gamma_k}$   | 果持在 0.8mm(<br>是保持在 2gn 直<br>挂行 12 次,一<br>无燃烧,并且<br>%(完全放电》<br>d to the platform<br>fully transmit to<br>from 7Hz to a<br>maintained at 0.0<br>of 2gn occurs (as<br>increased to 2<br>utually perpendicular to the term<br>e, no venting, reattery after test | 总偏移 1.6mm<br>到频率增加至<br>共振动 3h。设<br>每个试验电池<br>状态的试验电池<br>the vibration. To<br>peak accelera<br>8mm (1.6mm)<br>approximately<br>00Hz. This cy<br>dicular mountinal<br>minal face. Ce<br>no disassembly<br>ting is not less | n),并增加频率<br>到 200Hz。对三<br>战 验 电池 或 电 池<br>地 或 电池组在 ion machine we<br>find the vibration of lgn is nototal excursion<br>25Hz). A peak<br>cle shall be reping positions of<br>lls and batteried, no rupture and than 90% of it | 直到最大加<br>三个互相垂直<br>也组应无重量<br>式验后的开路<br>外)。<br>without<br>hall be a<br>naintained<br>) and the<br>acceleration<br>peated 12<br>the cell. One<br>s meet this<br>id no fire and<br>s voltage |
| 样品状态<br>Sample<br>status           | b3#~b4#: 第二   | st cycle in fully<br>二十五个循环岩  | E电的电池;<br>charged states;<br>E全充电的电池<br>ding in fully chai |  |  |  |   |
| 样品编号                               | 测试前   | Before  | 测试后  | After  | 质量损失   | 剩余电压   | 测试结果  |
| Sample No.                         | 电池质量<br>m <sub>l</sub> (kg)   | 开路电压<br>V <sub>1</sub> (V)  | 电池质量<br>m <sub>2</sub> (kg)                                | 开路电压<br>v <sub>2</sub> (V)   | Mass loss<br>(%)   | Residual<br>OCV(%)   | 一次<br>Test result   |
| b1#                                | 47.470  | 53.0  | 47.470   | 53.0   | 0.00   | 100.00   | O -   |
| ,010                               | 15  | 52.6  | 47.468   | 52.5   | 0.00   | 99.81  | 0   |
| b2#                                | 47.468  | XO TO   | 7/2  |  | 44   | _6   | - LIM   |
| b2#<br>b3#                         | 47.468  | 53.1  | 47.470   | 52.9   | 0.00   | 99.62  | 0   |

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。 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>pendix 4   | KECK.   | 测试项目名<br>Name of to  |  | 冲 d<br>Shoo  |   |
|--|---|--|---|--|--|--|---|
| 110.                                   | Ар  | pendix 4   | 01/5  | Name of te   | 281.5  | Silot  | K GU  |
| 标准要求<br>Requirement<br>of Standard     | gn=√(30000 / n<br>其正负极各冲<br>解体、无破裂和<br>验前电压的 90<br>Test cells and b<br>support all mou<br>shock of peak a<br>milliseconds. E<br>by three shocks<br>or battery for a<br>leakage, no ven<br>cell or battery a | 组用坚硬支架紧加ass)中较小者的击 3 次,共冲击 7 次,并且 1%(完全放电物 1%(完全放电物 15 celleration of 5 cach cell or batter total of 18 shock ting, no disasser fter testing is no atting to voltage | 的正弦波冲击,<br>去 18 次。各试<br>每个试验电池<br>状态的试验电池<br>secured to the<br>of each test batto<br>Ogn or acceleratory shall be subj<br>direction of thr<br>ks. Cells and ba<br>mbly, no ruptur<br>ot less than 90% | 脉冲持续时验电池或电池或电池组在试电池组在试电池组像 testing machinery. Each Large tion $(g_n) = \sqrt{30}$ ected to three emutually penteries meet the and no fire a for of its voltage | 间 11ms,接三组应无重量损组应无重量损免的开路电外)。 e by means of a batteries shall 1000 / mass) a shocks in the popendicular mois requirement and if the open cimmediately principle. | 个相互垂直的<br>失、无渗漏、<br>压不少于其在<br>a rigid mount w<br>be subjected to<br>nd pulse duration<br>positive direction<br>counting position<br>if there is no ma<br>circuit voltage o | 轴向分别;<br>无排气、<br>hich will<br>o a half-sin<br>on of 11<br>followed<br>s of the cel<br>ass loss, no<br>f each test<br>edure. The |
|  |   | Mass is express  |   | thon co  | CHANGE   |  |   |
| 样品状态<br>Sample<br>status               | states.( NOTE:<br>b1#~b2#: 第一<br>b1#~b2#: firs<br>b3#~b4#: 第二   |  | en kilograms)<br>电的电池;<br>charged states;<br>全充电的电池   | , the  | CHANG!   | TECHNO!  | OGYCENT   |
| Sample<br>status                       | states.( NOTE:<br>b1#~b2#: 第一<br>b1#~b2#: firs<br>b3#~b4#: 第二   | Mass is express  - 个循环完全充 t cycle in fully c - 十五个循环完 er 25 cycles endi  | en kilograms)<br>电的电池;<br>charged states;<br>全充电的电池   | orged states.  | 质量损失   | 剩余电压   | ONEDE   |
| Sample                                 | b1#~b2#: 第一<br>b1#~b2#: 第二<br>b1#~b2#: firs<br>b3#~b4#: 第二<br>b3#~b4#: afte   | Mass is express  - 个循环完全充 t cycle in fully c - 十五个循环完 er 25 cycles endi  | 电的电池;<br>eharged states;<br>全充电的电池<br>ing in fully char   | orged states.  | 质量损失<br>Mass loss<br>(%)   | 剩余电压<br>Residual<br>OCV(%)   | 测试结』<br>Test resu   |
| Sample<br>status<br>样品编号               | states.( NOTE:<br>b1#~b2#: 第一<br>b1#~b2#: firs<br>b3#~b4#: 第二<br>b3#~b4#: afte  | Mass is express  - 个循环完全充 t cycle in fully c - 十五个循环完 er 25 cycles endi Before  开路电压   | 电的电池;<br>charged states;<br>全充电的电池<br>ing in fully char<br>测试后  | 。<br>rged states.<br>· After<br>开路电压   | Mass loss  | Residual   | 测试结』  |
| Sample<br>status<br>样品编号<br>Sample No. | b1#~b2#: 第一<br>b1#~b2#: 第一<br>b1#~b2#: firs<br>b3#~b4#: 第二<br>b3#~b4#: afte   | Mass is express  - 个循环完全充 t cycle in fully c - 十五个循环完 er 25 cycles endi  Before  | 电的电池;<br>charged states;<br>全充电的电池<br>ing in fully char<br>测试后<br>电池质量<br>m <sub>2</sub> (kg)   | rged states. After  开路电压 v2(V)   | Mass loss<br>(%)   | Residual<br>OCV(%)   | 测试结』<br>Test resu   |
| Sample status<br>样品编号<br>Sample No.    | b1#~b2#: 第一<br>b1#~b2#: 第一<br>b1#~b2#: firs<br>b3#~b4#: 第二<br>b3#~b4#: afte<br>测试前<br>电池质量<br>m <sub>1</sub> (kg)   | Mass is express  - 个循环完全充 t cycle in fully c - 十五个循环完 er 25 cycles endi  Before  开路电压 v1(V)  53.0  | 电的电池;<br>charged states;<br>全充电的电池<br>ing in fully char<br>测试后<br>电池质量<br>m <sub>2</sub> (kg)   | orged states.  After  开路电压 v2(V)   | Mass loss (%) 0.00   | Residual<br>OCV(%)   | 测试结》<br>Test resu<br>O  |

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|                                    | 7.0   |   | 6.7   |
|------------------------------------|---|---|---|
| 序号                                 | 附表 5  | 测试项目名称  | 外部短路  |
| No.                                | Appendix 5  | Name of test  | External short circuit  |
| 标准要求<br>Requirement of<br>Standard | 待试验电池或电池组的外壳温度和小于 0.1Ω 的短路条件,当电池或再观察电池或电池组 6h 才结束试6h 内应无解体、无破裂和无燃烧。The cell or battery to be tested shall reaches 57±4℃ and then the cell or external resistance of less than 0.1 of least one hour after the cell or battery must be observed for a further this requirement if their external tem rupture and no fire within six hours of the contract of | 电池组外壳温度回到 57±4℃后线验。电池或电池组的外壳温度应验。 电池或电池组的外壳温度应be temperature stabilized so that it battery shall be subjected to a shohm at 57±4℃. This short circuit copy external case temperature has reter six hours for the test to be concluperature does not exceed 170℃ a | 继续至少 1h,然后短路断开,<br>在不超过 170℃,并且试验后<br>s external case temperature<br>rt circuit condition with a total<br>pondition is continued for at<br>curned to 57±4℃. The cell or<br>uded. Cells and batteries meet |
| 样品状态<br>Sample status              | b1#~b2#: 第一个循环完全充电的b1#~b2#: first cycle in fully charge b3#~b4#: 第二十五个循环完全充b3#~b4#: after 25 cycles ending in   | ed states;<br>电的电池。   | CHANGE CENTRE   |
| 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 Remark   |
| b1#                                | 58.5  | 000   | gotte / gote  |
| b2#                                | 60.1  | ECHINO TRICTIO  | NE DE LE LE   |
| b3#                                | 57.9  | Is Dis Ocusion  | GZHOU /   |
| 170                                | Ye,   | 70.   | . 12  |

D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。

Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire.

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| 解表 6 Appendix 6 Manne of test  |             |   |   |   |  |   |                                 |            |
|--|-------------|---|---|---|--|---|---------------------------------|------------|
| 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;(a)施加的力量达到13kN=0.78kN;(b)电池的电压下降至少100 毫伏;或(c)电池变形量达原分量反射,成为电池点处量,或验电池或转速电池应从最宽的一面施压。纽加/硬币电池应从其平坦表面施压。固柱形电池应从与纵轴垂直的方向施压。每个电池只做一次挤压试验。 试验电池或电池组的组成电弦外部温度不超过170°C,并且在试验过程中和试验后 6 小时内应 5 standard of Standard Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 in diameter): A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. (a)The applied force reaches 13kN±0.78kN; (b)The voltage of the cell drops by at least 100mV;or (c)The cell is deformed by 50% or more of its original thickness. Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness. Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness. Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness. Checle 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.  Cl#-C5#: 第一个情环 50% 的 數定容量的电池。 Cd#-C10#: 第二十五个情环 50% 的 數定容量的电池。 Cd#-C10#: 第二十五个情环 50% 的 數定容量的电池。 Cd#-C10#: 第二十五个情环 50% of the design rated capacity of cell.  P#品表面最高度 测试结果 各注 Apple O / Cd# 24.9 O / Cd# 24.6 O / C6# 24.9 O / Cd# 24.7 O / C7# 24.6 O / Cd# 24.9 O / |             |   |   |   |  |   |                                 | SUANC      |
| (b)电池的电压下降至少 100 毫伏; 或 (c)电池变形量达原始厚度的 50%或以上。 棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币电池应从其平担表面施压。圆柱形电池应从 与纵轴垂直的方向施压。每个电池尺做一次挤压试验。 试验电池或电池组的组成电芯外部温度不超过 170°C,并且在试验过程中和试验后 6 小时内应 Standard Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 in diameter): A cell or component cell is to be crushed between two flat surfaces. The crushing is to be crushed the first of the three options below is reached. (a)The applied force reaches 13kN±0.78kN; (b)The voltage of the cell drops by at least 100mV; or (c)The cell is deformed by 50% or more of its original thickness. Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released. 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.  C1#-C5#: 第一个循环 50% of the design rated capacity of cell.  PHE 表面最高温度 Max External Temperature(C) Test result Remark  C1# 24.6 O / C6# 24.9 O /  C2# 24.7 O / C7# 24.6 O /  C3# 24.2 O / C8# 25.0 O /  C3# 24.2 O / C8# 25.0 O /  C4# 24.5 O / C9# 24.2 O /   | ECHNOL      | 将电池或元件电池<br>为 1.5cm/s。挤压持   | 放在两个平<br>f续进行,直   | 面之间挤压<br>直到出现以  | 压,挤压力度:  | 逐渐加大,在第   |                                 | 速度大约       |
| 不作及水<br>Requirement of Standard  |             | (b)电池的电压下降<br>(c)电池变形量达原<br>棱柱形或袋装电池  | 至少 100 毫<br>始厚度的 5<br>应从最宽的                                   | 伏; 或<br>0%或以上<br>一面施压。                                      | 纽扣/硬币电   |   | 面施压。圆柱形                         | 电池应从       |
| 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;  (b)The voltage of the cell drops by at least 100mV; or  (c)The cell is deformed by 50% or more of its original thickness.  Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.  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.  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.  C1#-C5#: 第一个循环 50% 的额定容量的电芯。 C6#-C10#: 第二十五个循环 50% 的额定容量的电芯。 C6#-C10#: 第二十五个循环 50% 的额定容量的电芯。 C6#-C10#: 第二十五个循环 50% 的额定容量的电芯。 C6#-C10#: 第二十五个循环 50% of the design rated capacity of cell.  Part  | Requirement | 试验电池或电池组<br>无解体、无破裂、  | 的组成电芯<br>无起火。   | 外部温度ス   | 不超过 170℃,  | 并且在试验过程   |                                 |            |
| Once the maximum pressure has been obtained, the voltage drops by at least 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released. 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.  C1#~C5#: 第一个循环 50% 的额定容量的电芯。 C1#~C5#: first cycle at 50% of the design rated capacity of cell.  C6#~C10#: 第二十五个循环 50% 的额定容量的电芯。 C6#~C10#: 第二十五个循环 50% of the design rated capacity of cell.  样品编号 Sample No.  FEB 表面最高温度 Max External Temperature(°C)  Max External Temperature(°C)  C1# 24.6 O / C6# 24.9 O /  C2# 24.7 O / C7# 24.6 O /  C3# 24.2 O / C8# 25.0 O /  C4# 24.5 O / C9# 24.2 O /   | of Standard | diameter): A cell or<br>gradual with a speed<br>continued until the f<br>(a)The applied force | component of approximate of the the reaches 131               | cell is to be<br>mately 1.5cr<br>ree options<br>kN±0.78kN   | crushed between/s at the first below is reach;                                 | een two flat surface point of contact.                          | ces. The crushing               | g is to be |
| 样品状态 Sample status       C1#~C5#: first cycle at 50% of the design rated capacity of cell.         C6#~C10#: 第二十五个循环 50% 的额定容量的电芯。C6#~C10#: after 25 cycles at 50% of the design rated capacity of cell.         样品编号 Sample No.       样品表面最高温度 Max External Temperature(℃)       测试结果 Test result Remark       样品编号 Sample No.       样品表面最高温度 Max External Temperature(℃)       测试结果 Remark Remark       Age Test result Remark         C1#       24.6       O       /       C6#       24.9       O       /         C2#       24.7       O       /       C7#       24.6       O       /         C3#       24.2       O       /       C8#       25.0       O       /         C4#       24.5       O       /       C9#       24.2       O       /   |             | Once the maximum cell is deformed by a Each test cell or con this requirement if the          | pressure has<br>at least 50%<br>aponent cell<br>neir external | s been obtai<br>of its origin<br>is to be sub<br>temperatur | ned, the voltage<br>nal thickness, to<br>ejected to one of<br>the does not exc | ge drops by at least<br>the pressure shall<br>crush only. Cells | be released.<br>and component c | ells meet  |
| 特的網号 Sample No.         Max External Temperature(°C)         测试结果 Test result         保护網号 Remark         Max External Temperature(°C)         测试结果 Test result         保护網号 Remark           C1#         24.6         O         /         C6#         24.9         O         /           C2#         24.7         O         /         C7#         24.6         O         /           C3#         24.2         O         /         C8#         25.0         O         /           C4#         24.5         O         /         C9#         24.2         O         /  |             | C1#~C5#: first cyc<br>C6#~C10#: 第二十   | cle at 50% o<br>- 五个循环 5                                      | f the design<br>50%的额定                                      | rated capacity<br>容量的电芯。   |   | ig thonch                       | 50         |
| C2#     24.7     O     /     C7#     24.6     O     /       C3#     24.2     O     /     C8#     25.0     O     /       C4#     24.5     O     /     C9#     24.2     O     /  |             | Max External  | 11/200  |   |  | Max Externa   | 1                               |            |
| C3# 24.2 O / C8# 25.0 O / C4# 24.5 O / C9# 24.2 O /  | C1#         | 24.6  | О   | ANG Z   | C6#  | 24.9  | OST                             | /          |
| C4# 24.5 O / C9# 24.2 O /  | C2#         | 24.7  | 0   | /   | € C7#  | 24.6  | 0                               | act Kelo   |
|  | C3#         | 24.2  | <i>&gt;</i> 0   | OCT COL   | C8#  | 25.0  | 0                               | /          |
| C5# 24.1 O / C10# 24.4 O /   | C4#         | 24.5  | 0   | /   | C9#  | 24.2  | 0                               | 1,10       |
|  | C5#         | 24.1  | О   | 1,50  | C10#   | 24.4  | O                               | SUPER      |

注: D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。

Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire.

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|                                    | 30   |  | 60,  | 1,6)  |
|------------------------------------|--|--|--|---|
| 序号<br>No.                          | 附表 7<br>Appendix 7   | 测试项目名称<br>Name of test   |  | 充电<br>charge  |
| 标准要求<br>Requirement<br>of Standard | 充电电流必须是制造商建议的<br>(a)制造商建议的充电电压。<br>倍或 22V 两者中的较少者。<br>(b)制造商建议的充电电压。<br>可再充电电池组在环境温度<br>The charge current shall be twic<br>current. The minimum voltage of<br>(a) When the manufacturer's rec<br>voltage of the test shall be the le<br>22V.<br>(b) When the manufacturer's rec<br>of the test shall be 1.2 times the<br>Tests are to be conducted at a<br>Rechargeable batteries meet the<br>days of the test. | 大于 18V 时,试验的最小<br>大于 18V 时,试验的最小<br>下试验 24h。试样在试验<br>the manufacturer's reconsoft the test shall be as follow<br>commended charge voltage<br>esser of two times the maxic<br>commended charge voltage<br>maximum charge voltage.<br>ambient temperature. The | 最小电压应是电池组最力<br>电压应是最大充电电压<br>会后7天内应无解体和无<br>nmended maximum continus:<br>sis not more than 18V, the<br>imum charge voltage of the<br>sis more than 18V, the mi<br>duration of the test sha | 的 1.2 倍。<br>燃烧。<br>nuous charge<br>e minimum<br>e battery or<br>nimum voltage<br>all be 24 hours. |
| 样品状态<br>Sample<br>status           | b5#~b6#: 第一个循环完全充<br>b5#~b6#: first cycle in fully cl<br>b7#~b8#: 第二十五个循环完<br>b7#~b8#: after 25 cycles endin   | harged states;   | CON CENTER   | .INOLOGY CEN  |
| 样品编号                               | 测试结果   | e cti  |  | KEON .  |
| Sample No.                         | Test result  | / 3  | Remark   | 150   |
| b5#                                | 0  | CCHNOL   | ict in the desired   | CUSTON  |
| b6#                                | oct o  | RICI   | CUSTO, 1   | CINON   |
| b7#                                | Q, D   | CUSTO  | Tethon Lene  | 2   |
| b8#                                | MEDIE LOUSTO   | METHON CO  | AL.  | CENTE   |

注: D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。

Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly. No Rupture & No Fire.

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### **GUANGZHOU CUSTOMS DISTRICT TECHNOLOGY CENTER**

01112200001656-1(E) No:

Date: 2022-06-30

四半十十十

地址:中国广东省广州市天河区珠江新城花城大道66号B座 邮编Postcode: 510623 Add.: Tower B, No.66 Huacheng Avenue, Zhujiang Xincheng, Tianhe District, Guangzhou, Guangdong, P.R.C. Page: 12 of 14 电话Tel: 020-22131000 邮箱Email: ppdc@iqtcnet.cn 网址Website: https://www.iqtcnet.cn

| No.  | Appendix 8             | Name of test      | Forced discharge |
|------|------------------------|-------------------|------------------|
| 70,5 | <b>少以四中小子可由之中中小方</b> 页 | 连进连工厂100744本次中流中岛 | <u>大</u> 村       |

试验原电池或可冉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。

## Requirement of Standard

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in Ampere). Primary or rechargeable cells meet this requirement if there is no disassembly and no fire within seven days of the test.

| 100                      |                            |   |                        |
|--------------------------|----------------------------|---|------------------------|
| 样品状态<br>Sample<br>status | C11#~C20#: f<br>C21#~C30#: | 第一个循环完全放电的<br>irst cycle in fully discha<br>第二十五个循环完全加<br>after 25 cycles in fully di | rged states;<br>效电的电芯。 |

|                    | X .  | 5                   | χΟ.,         |                    | The state of the s |              |
|--------------------|------|---------------------|--------------|--------------------|--|--------------|
| 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 |
| 50                 | C11# | OTO O WHI           | /            | C21#               | O <sub>ct</sub> c <sup>(t)</sup>   | EHHO)        |
|                    | C12# | 0                   | 1            | C22#               | 0  | CTES / DEST  |
|                    | C13# | 0                   | of CELT 1    | C23#               | THE O DIST   | 1 FLOWING    |
| 3                  | C14# | CEET O MOLE         | 1 5 1/160    | C24#               | O OME  | ,,0157       |
|                    | C15# | OKEG                | Ne Fr        | C25#               | 0,000  | ANGTY /      |
|                    | C16# | OLE TRIO            | COMP /       | C26#               | o o  |              |
| N. P. L.           | C17# | Me O OTCH           | / METH       | C27#               | 0  | d CELLY      |
|                    | C18# | O                   | 9.           | C28#               | den o  | orog 1 trop  |
| 7                  | C19# | o 0                 | 1 10         | C29#               | O THE  | E PRIO       |
| 00,                | C20# | O CENT              | 10100        | C30#               | O  | TOMS         |

D-解体; R-破裂; F-起火; O-无解体、无破裂、无起火。

Note: D-Disassembly, R-Rupture, F-Fire, O-No Disassembly, No Rupture & No Fire.

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# 广州海关技术中心







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电话Tel: 020-22131000 邮箱Email: ppdc@iqtcnet.cn 网址Website: https://www.iqtcnet.cn

## 样品图片

## Photo of the sample

电池正面外观





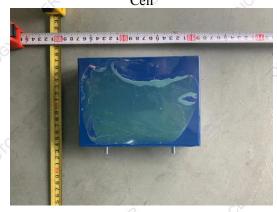
电池铭牌(含 Wh) Battery nameplate (With Wh)

**B**elicitysolar®

5.12KWH 51.2V

| Model                      | LPBA48100-OL      |
|----------------------------|-------------------|
| Normal Energy              |                   |
| Rated Voltage              | 51.2V             |
| Normal Capacity            | 100AH             |
| Recommend Charge&Discharge | 50A               |
| Communication              | CAN&RS485         |
| Cycle Life                 | ≥6000@25°C,80%DOD |
| Modules Connection         | 1~12 in parallel  |
| Working Temperature Range  | 0~55°C            |
| Ingress Protection         | IP65              |





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

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

电话(Tel): 020-38669019-811

电子邮箱(E-mail): battery@iqtcnet.cn

报告结束 End of report \*

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