



中国认可
国际互认
检测
TESTING
CNAS L4065



Report No.:
报告编号: FLS20240201U01

UN38.3 TEST REPORT

UN38.3 检测报告

Product Name: 产品名称:	Lithium Iron Phosphate Battery 磷酸铁锂电池
Model and Parameters: 型号参数:	FLA48100, 51.2V, 100Ah, 5.12kWh
Test Classification: 检测类别:	Commission test 委托检测
Issue Date: 签发日期:	2024-03-11

Tested by/测试 <i>Fangxingxiao</i> Test Engineer	Reviewed by/审核 <i>Jiwen Huang</i> Audit Engineer	Approved by/批准 <i>Xu Hongbin</i> Approval Engineer
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Guangzhou MCM Certification & Testing Co., Ltd.

广州邦禾检测技术有限公司

General Information 基本信息	
Application Information/申请信息:	
Applicant: 申请单位:	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address: 申请单位地址:	No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华业路 2 号
Contact Information: 联系方式:	Tel: 13580621578 E-mail: hailin.wu@felicitysolar.com
General Information/基本信息:	
Product Name: 产品名称:	Lithium Iron Phosphate Battery 磷酸铁锂电池
Product Classification: 产品分类:	Rechargeable Lithium Ion Battery 可充电锂离子电池
Trade Mark: 商标名称:	--
Model and Parameters: 型号参数:	FLA48100, 51.2V, 100Ah, 5.12kWh
Manufacturer: 制造单位:	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address: 制造单位地址:	No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华业路 2 号
Contact Information: 联系方式:	Tel: 13580621578 E-mail: hailin.wu@felicitysolar.com
Factory: 生产单位:	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address: 生产单位地址:	No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华业路 2 号
Testing Laboratory/测试实验室:	
Laboratory: 测试单位:	Guangzhou MCM Certification & Testing Co., Ltd. 广州邦禾检测技术有限公司
Address: 测试单位地址:	Building 2 No. 45 Zhong Er Section of Shiguang Road, Zhongcun Street, Panyu District, Guangzhou City, Guangdong Province, China. 中国广东省广州市番禺区钟村街市广路钟二路段 45 号 2 栋
Testing Location: 测试实验室地址:	As above 同上
Test Standard/测试标准:	
Standard Used: 使用标准:	Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 《试验和标准手册》 ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3
Deviation Description: 偏差描述:	None

Product Information/产品信息:		
1.	This battery assembly whose watt-hour rating is not more than 6200Wh, is constructed with 2 Lithium ion Battery Module (Model: 1P8S), and has overcharge, over-discharge, over current and short-circuits proof circuit. 这个电池总成由 2 个锂离子电池模组（型号：1P8S）通过串并联组成，额定瓦时数不大于 6200Wh，具有过充、过放、过流和短路保护电路。	
2.	The assembled batteries inside the battery assembly is tested according to the requirements of Rev.7 Amend.1 version and met the requirements (Test report shown as below) 电池总成中的组成电池按照第七版修订一的要求进行测试并满足其要求（测试报告如下）	
	TR no. 测试报告号	Model 型号
	FLS20240131U01	1P8S
	Rating 额定值	(1P8S) 25.6V, 100Ah, 2560Wh
3.	This battery assembly's mass and size 组装电池质量和尺寸	
	Mass 质量	55±2kg
	Size 尺寸	/

Label/标签:

Model	FLA48100
Nominal Voltage	51.2V
Capacity	5.12kWh
Operating Voltage	44.8-57.6V
Recommend Charge/Discharge Current	≤100A
Recommend Charge/Discharge Power	≤5,000W
Scalability	Up to 15 units in parallel
Communication	RS485 / CAN
Cycle Life	≥6,000@25°C, 80%DOD
Charging Temperature Range	0-55°C
Discharging Temperature Range	-20-55°C

Technical Parameters/技术参数:

Device Under Test 待检器件	Assembled battery 组成电池	Battery assembly 电池总成
Model 型号	1P8S	FLA48100
Nominal Capacity 额定容量 (Ah)	100	100
Nominal Voltage 额定电压 (V)	25.6	51.2
Nominal Charge Current 额定充电电流 (A)	50	50
Nominal Discharge Current 额定放电电流 (A)	50	50
Maximum Charge Current 最大充电电流 (A)	100	100
Maximum Discharge Current 最大放电电流 (A)	100	100
Maximum Charge Voltage 最大充电电压 (V)	29.2	58.4
Cut-off Voltage 放电截至电压 (V)	22.4	44.8

Remark/备注:
/

Test Conclusion 测试结论				
Clause 条款	Test item 测试项目	Sample No. 样品编号	Test Result 测试结论	Remark 备注
38.3.3(f)	(Small battery assembly) (小型电池总成)	BP1#, BP2#	P	/
38.3.3(g)	(Large battery assembly) (大型电池总成)	/	N/A	/
38.3.4.1	Altitude simulation 高度模拟	/	N/A	/
38.3.4.2	Thermal test 温度循环测试	/	N/A	/
38.3.4.3	Vibration 振动	BP1#	P	/
38.3.4.4	Shock 冲击		P	/
38.3.4.5	External short circuit 外部短路		P	/
38.3.4.6	Impact / Crush 撞击 / 挤压	/	N/A	/
38.3.4.7	Overcharge 过度充电	BP2#	P	/
38.3.4.8	Forced discharge 强制放电	/	N/A	/
Ambient Temperature: 20 ± 5°C 环境温度:				
Receipt Date: 2024-01-31 接收日期:				
Test Date: 2024-01-31 ~ 2024-03-05 测试时间:				
Test Conclusion/测试结论: The sample submitted by Guangzhou Felicity Solar Technology Co., Ltd have passed the test items of Manual of Test and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3. 由广州菲利斯太阳能科技有限公司送检的样品符合《试验和标准手册》ST/SG/AC.10/11/ Rev.7/ Amend.1, section 38.3 的要求。 Seal: 检测专用章:				

Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3			
Clause 条款	Requirement + Test 要求+测试方法	Result - Remark 备注-结果	Verdict 判断
38.3.2	Scope 范围		P
38.3.3	(Required test samples) (所需测试样品)		P
38.3.3 (a)~(e)	(Full test samples & states) (全项测试样品及状态)	Tests are made with the number of batteries specified in Section 38.3 Table 38.3.3 测试根据 38.3 章 38.3.3 表中的电池数量进行	P
38.3.3(f)	(Small battery assembly) (小型电池总成)	Complied 符合要求	P
(Detail 1) (细则说明一)	The assembled battery which the aggregate lithium content of all anodes, when fully charged, is not more than 500g, or in the case of a lithium ion battery, with a Watt-hour rating of tot more than 6200Wh. 集成电池组在完全充电时所有正极的合计锂含量不超过 500g; 或在锂离子电池组的情况下, 如额定的瓦特小时数不超过 6200Wh	Lithium ion battery, The total watt-hour rating is 5.12kWh 锂离子电池, 总瓦时数为 5.12kWh	P
(Detail 2) (细则说明二)	Batteries that have passed all applicable tests. 集成电池组的组成电池通过适用的所有测试	The lithium-ion battery module comprises the battery system through a hierarchical structure. The base battery module passes all applicable tests of UN 38.3 And See test report FLS20240131U01 锂离子电池模块通过层级结构组成电池系统, 作为基础的电池模块通过 UN 38.3 的适用的所有测试, 见测试报告 FLS20240131U01	P
(Detail 3) (细则说明三)	A battery assembly in a fully charged state shall be tested under tests T3, T4 and T5 完全充电状态的电池总成做试验 T.3、T.4 和 T5	Tested complied 测试执行	P
(Detail 4) (细则说明四)	In addition, test T7 in the case of a rechargeable battery assembly 另外, 如果是可充电电池总成, 则还需进行 T.7 试验	Tested complied 测试执行	P
38.3.3(g)	(Large battery assembly) (大型电池总成)	Not large battery assembly 非大型电池总成	N/A
38.3.4	Procedure 程序		P

Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3			
Clause 条款	Requirement + Test 要求+测试方法	Result - Remark 备注-结果	Verdict 判断
	<p>Test T.1 to T.5 shall be conducted in sequence on the same cell or battery. 小型电芯或电池应按顺序进行试验 T.1 至 T.5。</p> <p>Test T.6 and T.8 shall be conducted using not otherwise tested cells or batteries. 试验 T.6 和 T.8 应使用未试验过的电芯或电池。</p> <p>Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purpose of testing on cycled batteries. 试验 T.7 可以使用原先在试验 T.1 至 T.5 中使用过的未损坏电池进行。</p>	<p>Tests are made with the number of batteries specified in Section 38.3 Table 38.3.3 测试根据 38.3 章 38.3.3 表中的电池数量进行</p>	P
38.3.4.1	Altitude Simulation 高度模拟		N/A
38.3.4.2	Thermal Test 温度试验		N/A
38.3.4.3	Vibration 振动		P
	<p>For cells and small batteries: from 7 Hz a peak acceleration of $1g_n$ is maintained until 18 Hz reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of $8g_n$ occurs (approximately 50Hz). A peak acceleration of $8g_n$ is then maintained until the frequency is increased to 200Hz 对于电芯和小电池: 保持峰值加速度 $1g_n$, 从 7Hz 到 18Hz。然后振幅保持在 0.8mm (总偏移量为 1.6mm), 增加频率, 直到峰值加速度达到 $8g_n$ (约 50Hz)。然后保持 $8g_n$ 的峰值加速度, 直到频率增加到 200Hz</p>		N/A
	<p>For large batteries: from 7 Hz to a peak acceleration of $1g_n$ is maintained until 18 Hz reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of $2g_n$ occurs (approximately 25 Hz). A peak acceleration of $2g_n$ is then maintained until the frequency is increased to 200 Hz 对于大电池: 保持峰值加速度 $1g_n$, 从 7Hz 到 18Hz。然后振幅保持在 0.8mm (总偏移量为 1.6mm), 增加频率, 直到峰值加速度达到 $2g_n$ (约 25Hz)。然后保持 $2g_n$ 的峰值加速度, 直到频率增加到 200Hz</p>		P
	<p>Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% 试验结果: 无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%</p>	See the TABLE: 38.3.4.3	P
	<p>The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states 测试电压的要求不适用于完全放电的电芯和电池</p>		N/A
38.3.4.4	Shock 冲击		P
	<p>Each cell shall be subjected to a half-sine shock of peak acceleration of $150g_n$ and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of $50g_n$ and pulse duration of 11 milliseconds. 每一个电芯应承受峰值加速度为 $150g_n$、脉宽为 6 毫秒的半正弦冲击。或者, 大电芯可以按峰值加速度为 $50g_n$、脉宽为 11 毫秒的半正弦冲击</p>		N/A

Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3			
Clause 条款	Requirement + Test 要求+测试方法	Result - Remark 备注-结果	Verdict 判断
	<p>Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. 每个电池应承受的峰值加速度取决于电池的质量。</p> <ul style="list-style-type: none"> - For small battery, smaller one of $150g_n$ or $\sqrt{100850/mass}$ - For large battery, smaller one of $50g_n$ or $\sqrt{30000/mass}$ <p>The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries 小电池的脉宽应为 6 毫秒, 大电池的脉宽应为 11 毫秒</p>		P
	Peak acceleration 峰值加速度	23.35g _n	P
	Pulse duration 脉宽	11ms	P
	<p>Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks 每一个电芯或电池在安装位置的 3 个垂直的轴向的正方向和负方向各进行 3 次冲击, 总共 18 次</p>		P
	<p>Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% 试验结果: 无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%</p>	See the TABLE: 38.3.4.4	P
	<p>The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states. 测试电压的要求不适用于完全放电的电芯和电池</p>		N/A
38.3.4.5	External Short Circuit 外部短路		P
	<p>The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of $57\pm 4^\circ\text{C}$, measured on the external case 待测电芯或电池应加热一段时间, 以稳定均衡在 $57\pm 4^\circ\text{C}$ 的温度, 并测量外壳上的温度</p>		P
	<p>The exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries 小电芯/小电池的暴露/加热时间应至少为 6 小时, 大电芯/大电池的暴露/加热时间应至少为 12 小时</p>		P
	<p>Then the cell or battery at $57\pm 4^\circ\text{C}$ shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm 然后, 在 $57\pm 4^\circ\text{C}$ 下的电芯或电池应经受一次短路, 外部线路总的电阻小于 0.1 欧姆</p>		P
	<p>This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57\pm 4^\circ\text{C}$, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value 在电芯或电池外部外壳温度恢复到 $57\pm 4^\circ\text{C}$ 后, 短路状态继续持续至少一小时, 或对于大电池的情况下, 降至试验期间观察到的最大温升的一半, 并保持在该值以下</p>		P
	<p>The short circuit and cooling down phases shall be conducted at least at ambient temperature 短路和冷却阶段应至少在环境温度下进行</p>		P

Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3			
Clause 条款	Requirement + Test 要求+测试方法	Result - Remark 备注-结果	Verdict 判断
	Results: external case temperature does not exceed 170°C and there is no disassembly, no rupture and no fire during the test and within six hours after the test 试验结果: 外部温度不超过 170°C, 试验期间和试验后 6 小时内, 无解体、破裂或起火现象	See the TABLE: 38.3.4.5	P
38.3.4.6	Impact/Crush 撞击/挤压		N/A
38.3.4.7	Overcharge 过度充电		P
	Applicable to rechargeable lithium cell/battery with overcharge protection 适用于具有过充电保护功能的可充电锂电芯/电池		P
	The charge current shall be twice the manufacturers' recommended maximum continuous charge current. 充电电流应为制造商推荐的最大持续充电电流的两倍		P
	Test current 试验电流	200A	P
	When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V 制造商建议的充电电压不大于 18 伏时, 实验的最小电压应是电池组最大充电电压的两倍或 22 伏两者中的较小者 When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times maximum charge voltage 制造商建议的充电电压大于 18 伏时, 实验的最小电压应是最大充电电压的 1.2 倍		P
	Test voltage 试验电压	70.08V	P
	Tests are to be at ambient temperature. The duration of the test shall be 24 hours 测试在室温下进行, 测试时间为 24h		P
	Results: there is no disassembly and no fire during the test and within seven days after this test 试验结果: 试验期间和试验后 7 天内, 无解体或起火现象	See the TABLE: 38.3.4.7	P
38.3.4.8	Forced Discharge 强制放电		N/A

TABLE: 38.3.4.3 Vibration 振动							P
Model	Before Test		After Test		Mass loss (%)	Residual OCV (%)	Results
	Mass(kg)	OCV(V)	Mass(kg)	OCV(V)			
Fully charged at first cycle							
BP1#	55.008	53.5	55.004	53.5	0.007	100.00	O
Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%							

TABLE: 38.3.4.4 Shock 冲击							P
Model	Before Test		After Test		Mass loss (%)	Residual OCV (%)	Results
	Mass(kg)	OCV(V)	Mass(kg)	OCV(V)			
Fully charged at first cycle							
BP1#	55.004	53.5	54.996	53.5	0.015	100.00	O
Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%							

TABLE: 38.3.4.5 External Short-circuit 外部短路				P
Model	Ambient(°C) (At 57± 4°C)	Testing resistance (mΩ)	Max. External Temperature(°C)	Results
Fully charged at first cycle				
BP1#	57.4	85.5	57.8	O
Results: O = no disassembly, no rupture, no fire during the test and within six hours after the test.				

TABLE: 38.3.4.7 Overcharge 过度充电				P
Model	The test current(A)	The test voltage(V)	OCV(V)	Results
Fully charged at first cycle				
BP2#	200	70.08	53.5	O
Results: O = no disassembly, no fire during the test and within seven days after this test.				

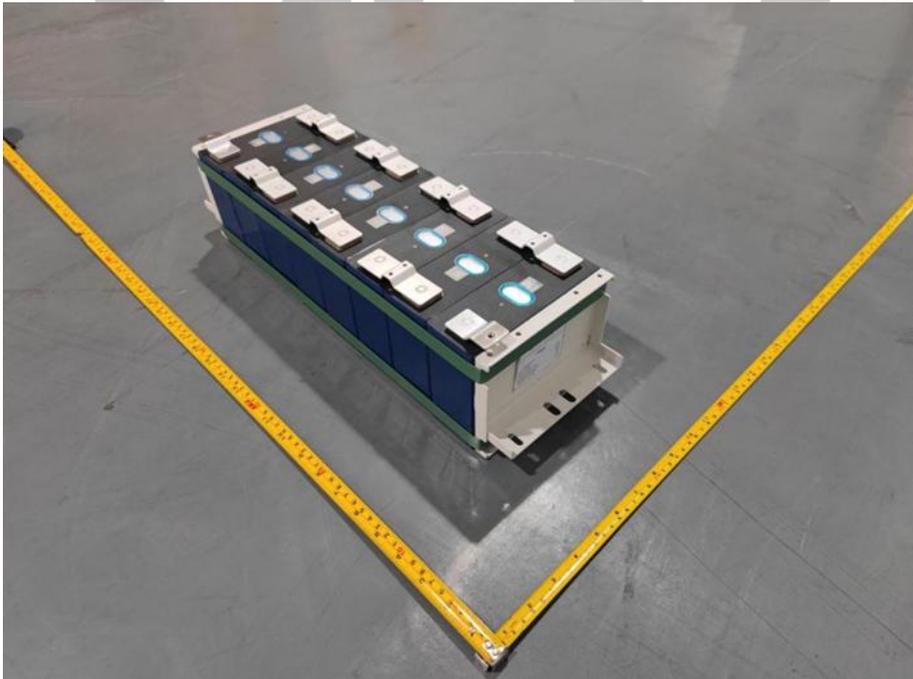
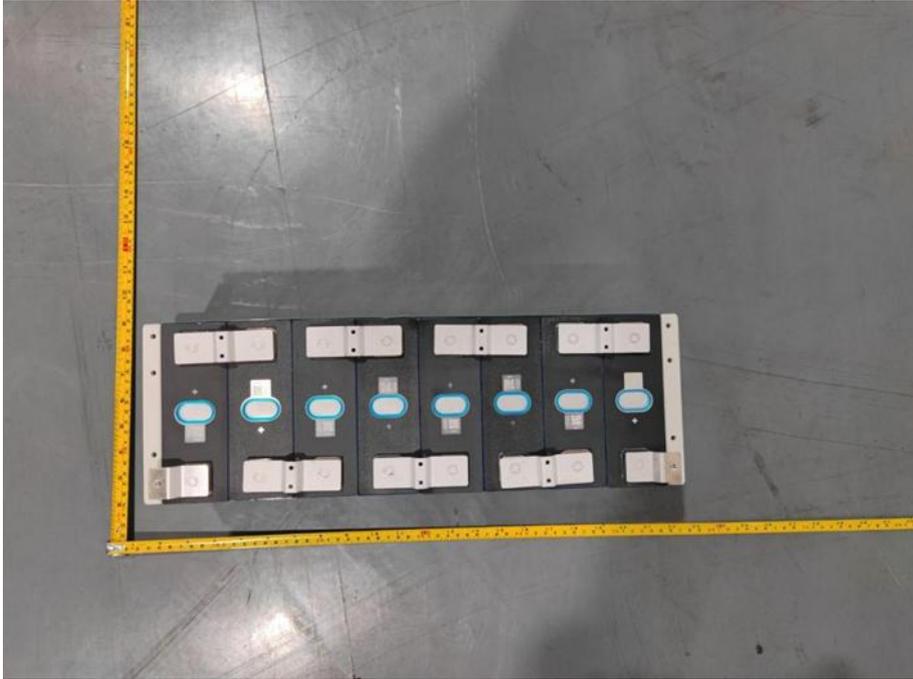
Photos of the Battery 电池照片

Battery Assembly: FLA48100, 51.2V, 100Ah, 5.12kWh



Photos of the Battery 电池照片

Battery module: 1P8S, 25.6V, 100Ah, 2560Wh



--End of the report--

Important Note
注意事项

1. This test report is invalid without the special testing seal and cross-page seal of Guangzhou MCM Certification & Testing Co., Ltd.
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本检测报告涂改无效。
5. Objection to this test report must be submitted to Guangzhou MCM Certification & Testing Co., Ltd. within 15 days after the publication of the report.
若对此检测报告有异议，必须在报告发布之日起十五天内向广州邦禾检测技术有限公司提出。
6. This test report is only responsible for the received samples.
本检测报告仅对收到的样品负责。
7. As for the test results, "N/A" means "Not applicable", "P" means "Pass" and "F" means "Fail".
本检测结果中"N/A"表示“不适用”，"P"表示“通过”，"F"表示“不通过”。

Testing Lab.:	Guangzhou MCM Certification & Testing Co., Ltd.
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