



中国认可
国际互认
检测
TESTING
CNAS L0095

Page 1 of 14 Pages

No.: RZUN2024-2078

检测报告

TEST REPORT

UN38.3

NAME OF SAMPLE:

Lithium-ion battery pack

产品名称:

锂离子电池组

CLIENT:

EcoFlow Innovation Ltd.

委托单位:

深圳市正浩智造科技有限公司

CLASSIFICATION OF TEST:

Commission Test

检测类别:

委托测试

威凯检测技术有限公司
CVC Testing Technology Co., Ltd.

检测报告

TEST REPORT

No.: RZUN2024-2078

Page 2 of 14 Pages

Name of samples: Lithium-ion battery pack 样品名称: 锂离子电池组	Type/Model: 型号规格: EFD521-EB 51,2V 80Ah 4096Wh
Color: Black 样品颜色: 黑色	Physical shape: Prismatic 样品形状: 棱柱形
Commissioned by: EcoFlow Innovation Ltd. 委托单位: 深圳市正浩智造科技有限公司	Commissioner address: RM 101, Plant #1, Runheng Industrial Zone, Fuyanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R.China 委托单位地址: 深圳市宝安区福海街道展城社区福园一路润恒工业厂区 1# 厂房 101
Manufacturer: EcoFlow Innovation Ltd. 制造商: 深圳市正浩智造科技有限公司	Manufacturer address: RM 101, Plant #1, Runheng Industrial Zone, Fuyanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R.China 制造商地址: 深圳市宝安区福海街道展城社区福园一路润恒工业厂区 1# 厂房 101
Factory: Zhuhai Pengyuan Energy Storage Technology Co., Ltd. 生产厂: 珠海鹏远储能科技有限公司	Factory address: Factory Building (1), Factory Building (2), No.22 Chuangxing Middle Road, Hongqi Town, Jinwan District, Zhuhai, P. R.China. 生产厂地址: 珠海市金湾区红旗镇创兴中路 22 号厂房(一)、厂房(二)
Classification of test: Commission Test 检测类别: 委托测试	Quantity of sample: 4 battery packs, 30 cells 样品数量: 4 个电池组, 30 个电芯
Tested according to: 测试标准: ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3	Sample identification: 样品标识序号: b1#~b4#, c1#~c30#
Receiving date: 接样日期: 2024-03-11	Means of receiving: Submitted by commissioner 接样方式: 委托单位送样
Completing date: 完成日期: 2024-04-01	Test item: 8 items 测试项目: 8 项
Test conclusion: 检测结论: The Lithium-ion battery packs submitted by EcoFlow Innovation Ltd. are tested according to Section 38.3 of the Seventh revised edition Amendment 1 of the Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3). The test items are full items. The test results comply with the relevant requirements of the standard. 由深圳市正浩智造科技有限公司送检的锂离子电池组, 依据联合国《试验和标准手册》第七修订版修正 1 第 38.3 节进行检测, 试验为全项目, 试验结果符合标准相关要求。 Seal of CVC CVC 盖章 Date of issue: 签发日期: 2024-04-19	

Title: Manager
批准人职务: 经理

Approved by: Huang Kun Reviewed by: Zhang Siyao Tested by: Deng Junzhao

批 准:  审 核:  检 测: 

Description and illustration of the sample:

样品说明及描述:

The sample's status is good

样品状况良好。

The battery (EFD521-EB) is composed of cells (IFR40135), and the connection mode is: 4P16S

电池组 (EFD521-EB) 由电芯 (IFR40135) 组成, 连接方式为: 4P16S

Cell Dimensions/电芯尺寸: $\phi 40\text{mm} \times 135\text{mm}$

Watt-hour rating of each battery/ 单个电池组的瓦时率: 4096Wh

Test item 试验项目	Sample No. 样品编号	State 状态	Remark 备注
T.1~T.5	b1#~b2#	at first cycle, in fully charged states 第一个交替充电放电周期完全充电状态	-
	b3#~b4#	after 25 cycles ending in fully charged states 第 25 个交替充电放电周期完全充电状态	-
T.6	c1#~c5#	at first cycle at 50% of the design rated capacity 第一个交替充电放电周期充电到设计额定容量的 50%	-
	c6#~c10#	after 25 cycles ending at 50% of the design rated capacity 第 25 个交替充电放电周期充电到设计额定容量的 50%	
T.7	b1#~b2#	at first cycle, in fully charged states 第一个交替充电放电周期完全充电状态	using undamaged samples previously used in tests T.1 to T.5 使用试验 T.1 至 T.5 未损坏的样品
	b3#~b4#	after 25 cycles ending in fully charged states 第 25 个交替充电放电周期完全充电状态	
T.8	c11#~c20#	at first cycle, in fully discharged states 第一个交替充电放电周期完全放电状态	-
	c21#~c30#	after 25 cycles ending in fully discharged states 第 25 个交替充电放电周期完全放电状态	-

The test objects of T.1~T.5 and T.7 are battery packs, and the sample numbers are b1#~b4#

T.1~T.5、T.7 的测试对象为电池组, 样品编号为 b1#~b4#。

The test objects of T.6 and T.8 are component cells, and the sample numbers are c1#~c30#

T.6、T.8 的测试对象为组成电芯, 样品编号为 c1#~c30#。

Description of the sampling procedure:

取样程序的说明:

/

Description of the deviation from the standard, if any:

试验结果不符合标准项的说明:

/

Remarks:

备注:

Throughout this report a comma is used as the decimal separator.

本报告中以逗号代替小数点。

Photos of Samples and Labels/样品照片及标识

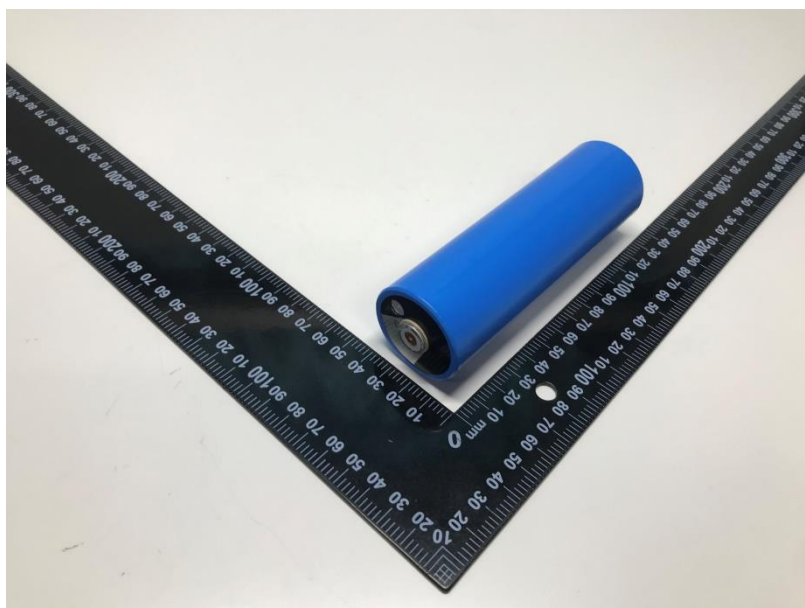
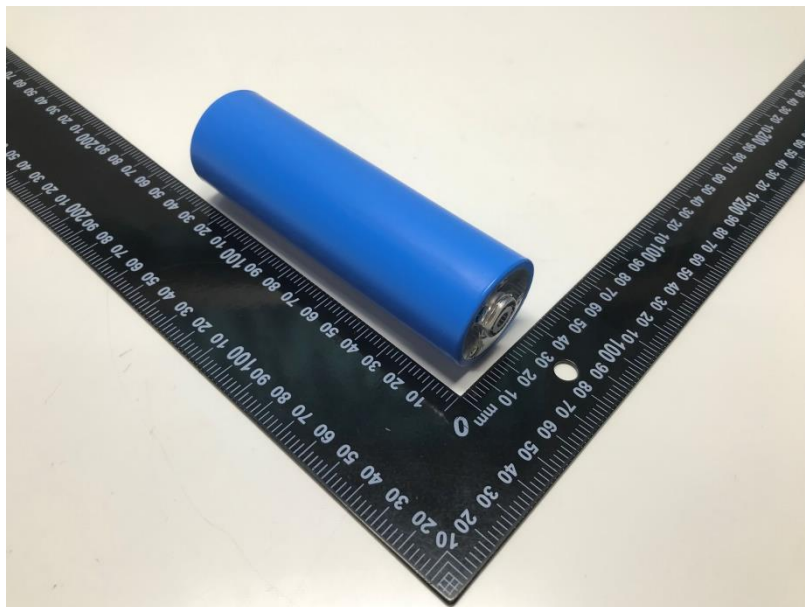
Battery/电池（EFD521-EB 51,2V 80Ah 4096Wh）



CONFIRM	EcoFlow DELTA Pro 3 Smart Extra Battery	Rechargeable Li-ion Battery Pack	<p>This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.</p> <p>EcoFlow DELTA Pro 3 Battery only works with EcoFlow DELTA Pro 3. Do not disassemble, short-circuit, crush or expose the product to fire and water.</p> <p>Manufacturer: EcoFlow Inc. RM 401, Plant #1, Rungheng Industrial Zone, Fuyuan Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R.China</p>
	Model/Modèle :	EFD521-EB	
	Nominal Voltage/Tension nominale :	51.2V _{nom}	
	Rated Capacity/Capacité nominale :	80Ah 4096Wh	
	Charge Temperature/Température de charge :	0-45°C	
	Discharge Temperature/Température de décharge :	-10-40°C	
	Battery Charge Input/Entrée de charge de la batterie :	40-58.4V _{DC} 80A Max	
	Output/Sortie :	40-58.4V _{DC} 100A (continuous)	
	Max Short Circuit Current :	800A 30s	
	IP:	IP20	
	IFP411/136/4P16SJM-10+40/90		

Photos of Samples and Labels/样品照片及标识

Component Cell/内部电芯 (IFR40135 3,2V 20Ah)



Rev. No.: RECH2021-010Page 6 of 11

ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4	Procedure/试验步骤		—
38.3.4.1	Test T.1: Altitude simulation/试验 T.1: 高度模拟		P
	Test cells and batteries shall be stored at a pressure of 11,6kPa or less for at least six hours at ambient temperature (20±5℃)/ 将电芯和电池在温度为 20±5℃，大气压力为不大于 11,6kpa 的环境中贮存不少于 6 个小时		
	Requirement/标准要求: 1 Cells and batteries Mass loss limit: ≤0,1% /样品质量损失≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90 %,此要求不适用于完全放完电的电池和电芯。 3 No leakage, no venting, no disassembly, no rupture and no fire 样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生	The samples b1#~b4# : No leakage, no venting, no disassembly, no rupture and no fire/ 编号为 b1#~b4# 的样品：无漏液、无排气、无解体、无破裂以及无着火现象 The data is shown in Table 1./ 数据见表 1	
38.3.4.2	Test T.2: Thermal test/试验 T.2: 温度试验		P
	Test cells and batteries are to be stored for/电池存储条件如下: 1 For small cells and batteries: one temperature cycle: 72±2℃(6h) —40±2℃(6h) / 对于小型电芯和电池：一次温度循环为 72±2℃(6h) —40±2℃(6h) For large cells and batteries: one temperature cycle: 72±2℃(12h) —40±2℃(12h) / 对于大型电芯和电池：一次温度循环为 72±2℃(12h) —40±2℃(12h) 2 The maximum time interval between test temperature extremes is 30 minutes/ 温度转换最大间隔时间为 30min 3 This procedure is to be repeated 10 times/重复 10 次循环 4 after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5℃)/循环结束后，电池在 20±5℃的条件下 搁置 24 小时		
	Requirements/标准要求 1 Cells and batteries Mass loss limit: ≤0,1% /样品质量损失≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90 %,此要求不适用于完全放完电的电池和电芯。 3 No leakage, no venting, no disassembly, no rupture and no fire 样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生	The samples b1#~b4# : No leakage, no venting, no disassembly, no rupture and no fire/ 编号为 b1#~b4# 的样品：无漏液、无排气、无解体、无破裂以及无着火现象 The data is shown in Table 1./ 数据见表 1	

ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4.4	Test T.4: Shock/试验 T.4: 冲击		P
	<p>1 Test cells and batteries shall be secured to the testing machine/ 以稳固的托架固定住每个电芯和电池样品的全部配件表面。</p> <p>2 Each cell shall be subjected to a half-sine shock of peak acceleration of 150 g_n and pulse duration of 6 milliseconds. Large cells may be subjected to a half-sine shock of peak acceleration of 50 g_n and pulse duration of 11 milliseconds. / 对每个电芯以峰值为 150g_n 的半正弦的加速度撞击，脉冲持续 6 毫秒，大型电芯须经受最大加速度 50g_n 和脉冲持续时间 11 毫秒的半正弦波冲击。</p> <p>Small batteries shall be subjected to a half-sine shock of peak acceleration of 150 g_n (or Acceleration(g_n)=$\sqrt{\left(\frac{100850}{mass}\right)}$, which is smaller) and pulse duration of 6 milliseconds, large batteries shall be subjected to a half-sine of peak acceleration of 50 g_n (or Acceleration(g_n)=$\sqrt{\left(\frac{30000}{mass}\right)}$, which is smaller) and pulse duration of 11 milliseconds/对每个电池以峰值为 150g_n（或与$\sqrt{\left(\frac{100850}{mass}\right)}$中的较小值）的半正弦的加速度撞击，脉冲持续 6 毫秒，大型电池须经受最大加速度 50g_n（或与$\sqrt{\left(\frac{30000}{mass}\right)}$中的较小值）和脉冲持续时间 11 毫秒的半正弦波冲击。</p> <p>3 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/每个电池或电池组须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。</p>		
	<p>Requirements/标准要求:</p> <p>1 Cells and batteries Mass loss limit: ≤0,1% /样品质量损失≤0,1%</p> <p>2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 样品试验后开路电压应不低于试验前开路电压的 90 % ,此要求不适用于完全放完电的电池和电芯。</p> <p>3 No leakage, no venting, no disassembly, no rupture and no fire 样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生</p>		

ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
38.3.4.6	Test T.6: Impact / Crush / 试验 T.6: 撞击/挤压		P
	Impact (applicable to cylindrical cells not less than 18mm in diameter) / 撞击（适用于直径不小于 18 毫米的圆柱形电池）		P
	1 This test sample cell or component cell is to be placed on a flat smooth surface/将试验样品用的电芯或聚合物电芯放在一个平坦光滑的平面上 2 A 15,8 mm diameter bar is to be placed across the centre of the sample, A 9,1kg mass is to be dropped from a height of 61±2,5cm onto the sample./将一直径为 15,8mm 的不锈钢圆棒横过电池中部放置后，将一质量为 9,1kg 的物体从 61±2,5cm 的高度落向样品。 3 The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15,8 mm ± 0,1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact./接受撞击的试样，纵轴应与平坦的表面平行并与横放在试样中心的直径 15,8±0,1 毫米弯曲表面的纵轴垂直。每一个试样只经受一次撞击。		
	Requirements/标准要求: 1 Cells external temperature not exceed 170℃.电芯或电池的最高表面温度应不超过 170℃ 2 No disassembly, no fire within six hours of this test 试验结束后 6 个小时之内，电芯和聚合物电芯应无解体和无着火现象发生	The samples c1#~c10#: no disassembly and no fire/编号为 c1#~c10# 的样品：无解体、无着火现象 The data is shown in Table 2./数据见表 2	
	Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter) / 挤压（适用于棱柱形、袋装、硬币/纽扣电池和直径小于 18 毫米的圆柱形电池）		N/A
	1 A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1,5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. /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 1,5 厘米/秒。挤压持续进行，直到出现以下三种情况之一： (a) The applied force reaches 13 kN ± 0,78 kN. / 施加的力达到 13kN±0,78kN (b) The voltage of the cell drops by at least 100 mV,/电池的电压下降至少 100 毫伏 (c) The cell is deformed by 50% or more of its original thickness./电池变形达原始厚度的 50%以上。 2. A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. /棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币形电池应从其平坦表面施压。圆柱形应从与纵轴垂直的方向施压。		
Requirements/标准要求: 1 Cells external temperature not exceed 170℃.电芯或电池的最高表面温度应不超过 170℃ 2 No disassembly, no fire within six hours of this test 试验结束后 6 个小时之内，电芯和聚合物电芯应无解体和无着火现象发生	-		

Table1: T1~T5 / 表 1. 试验 1~试验 5											
Sample No. 样品号	Mass prior to test / 试验前质量(kg)	OCV prior to test / 试验前电压(V)	Test T.1: Altitude simulation/ 试验 T.1: 高度模拟		Test T.2: Thermal test/ 试验 T.2: 温度试验		Test T.3: Vibration/ 试验 T.3: 振动		Test T.4: Shock/ 试验 T.4: 冲击		Test T.5: External Short Circuit/ 试验 T.5 外部短路
			Mass Loss(%) 质量损失(%)	OCV Retention Ratio(%) 电压保留比(%)	Mass Loss(%) 质量损失(%)	OCV Retention Ratio(%) 电压保留比(%)	Mass Loss(%) 质量损失(%)	OCV Retention Ratio(%) 电压保留比(%)	Mass Loss(%) 质量损失(%)	OCV Retention Ratio(%) 电压保留比(%)	Temp. (°C) 温度 (°C)
b1#	33,10	53,298	0,000	100,00	0,000	99,91	0,000	100,00	0,000	100,00	57,0
b2#	33,15	53,271	0,000	100,00	0,000	99,91	0,000	100,00	0,000	100,00	57,1
b3#	33,04	53,312	0,000	100,00	0,000	99,92	0,000	100,00	0,000	100,00	56,9
b4#	33,19	53,288	0,000	100,00	0,000	99,92	0,000	100,00	0,000	100,00	57,1

Table2: Impact / 表 2: 撞击											
Test T.6: Impact/试验 T.6: 撞击	Sample No. 样品号	c1#	c2#	c3#	c4#	c5#	c6#	c7#	c8#	c9#	c10#
	OCV prior to test / 试验前电压 (V)	3,293	3,297	3,295	3,297	3,292	3,290	3,291	3,292	3,292	3,295
	Temp. (°C) 温度 (°C)	23,2	23,1	23,0	23,1	23,0	23,2	23,0	23,1	23,0	23,2

Table3: Overcharge Test of batteries/ 表 3 过度充电					
Test T.7: Overcharge / 试验 T.7: 过度充电	Sample No. 样品号	b1#	b2#	b3#	b4#
	OCV prior to test / 试验前电压 (V)	53,250	53,224	53,270	53,244

Table 4: Forced discharge / 表 4. 强制放电											
Test T.8: Forced discharge / 试验 T.8: 强制放电	Sample No. 样品号	c11#	c12#	c13#	c14#	c15#	c16#	c17#	c18#	c19#	c20#
	OCV prior to test / 试验前电压(V)	2,697	2,686	2,692	2,697	2,695	2,697	2,692	2,692	2,689	2,691
	Sample No. 样品号	c21#	c22#	c23#	c24#	c25#	c26#	c27#	c28#	c29#	c30#
	OCV prior to test / 试验前电压(V)	2,691	2,687	2,689	2,690	2,691	2,682	2,687	2,688	2,692	2,690

注 意 事 项 Important

1. 报告无检测单位印章无效。
The test report is invalid without the seal of CVC.
2. 未经本试验室书面同意，不得部分地复制本报告。
Nobody is allowed to photocopy or partly photocopy this test report without written permission of CVC.
3. 本报告无批准人、审核人及检测人签名无效。
The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
4. 本报告涂改无效。
The test report is invalid if altered,
5. 对检测报告若有异议，应于收到报告之日起十五天内向检测单位提出。
Objections to the test report must be submitted to CVC within 15 days.
6. 本报告仅对送检样品负责。
The test report is valid for the tested samples only.
7. 判定栏中“-”表示“不需要判定”，“P”表示“通过”，“F”表示“不通过”，“N/A”表示“不适用”。
As for the Verdict, “-” means “no need for judgement”, “P” means “pass”, “F” means “fail” and “N/A” means “not applicable”.

****报告中未加 CMA 标志时，检测数据和结果仅供科研、教学或内部质量控制之用。****
The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

地 址： 广东省广州市科学城开泰大道天泰一路 3 号

广东省广州市黄埔区光谱东路 179 号百事高智慧园 D 栋（测试地点）

Lab Address: No.3, Tiantai 1st Road, Kaitai Avenue, Science City, Guangzhou, Guangdong, China.

Testing Location: Building D, BASIGO INTELLIGENT, No.179, Guangpu East Road, Huangpu District, Guangzhou, P. R. China.

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