

材料安全数据表

Material Safety Data Sheet

样品名称: 锂离子电池模组

Name of Sample: Lithium Battery Module

委托单位: 阳光电源股份有限公司

Commissioner: SUNGROW POWER SUPPLY Co., Ltd.

威凯检测技术有限公司
Vkan Certification & Testing Co., Ltd.



材料安全数据表

Material Safety Data Sheet

1. 化学品及企业标识 Chemical product and company identification	
样品名称 Name of Sample	锂离子电池模组 Lithium Battery Module
样品型号 Type/Mode	SMR032 64V 50Ah 3.2kWh
委托单位 Commissioned by	阳光电源股份有限公司 SUNGROW POWER SUPPLY Co., Ltd.
委托单位地址 Commissioner address	合肥市高新技术开发区习友路 1699 号 No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P. R. China.
制造商 Manufacturer	阳光电源股份有限公司 SUNGROW POWER SUPPLY Co., Ltd.
制造商地址 Manufacturer address	合肥市高新技术开发区习友路 1699 号 No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P. R. China.
鉴定依据 Inspection according to	联合国《关于危险品货物运输的建议书》 UN "Recommendations on the TRANSPORT OF DANGEROUS GOODS"
应急电话 Emergency telephone call	+86-13956977521
	接样日期: 2020-08-21 Receiving date:



Approved by:

Reviewed by:

Tested by:

批准:

Huangkun

审核:

zhangsiyao

检测:

Wei Guohua

2. 成分/组成信息 Composition information			
化学名称 Common Chemical Name	化学式 Chemical Formula	CAS 号 CAS No.	重量含量 Wt %
铝箔 Aluminum Foil	Al	7429-90-5	3.5
铜箔 Copper Foil	Cu	7440-50-8	7.8
磷酸铁锂 Lithium Iron Phosphate	LiFePO ₄	15365-14-7	34.1
碳 (专有) Carbon (proprietary)	C	7782-42-5	16.7
隔膜 (专有) Separator (proprietary)	(C ₃ H ₆) _n	9003-07-0	3
电解液 (专有) Electrolyte (proprietary)	LiPF ₆ /EC+DEC	/	20.3
铝合金 Aluminum Alloy	Al	7429-90-5	14.6
铅 Lead	Pb	7439-92-1	Not Detected
镉 Cadmium	Cd	7440-43-9	Not Detected
汞 Mercury	Hg	7439-97-6	Not Detected

3. 危险性概述 Hazards identification	
爆炸危险性 Explosive risk	该物品不属于爆炸危险品 This article does not belong to the explosion dangerous goods
易燃危险性 Flammable risk	该物品不属于易燃危险品 This article does not belong to the flammable material
氧化危险性 Oxidation risk	该物品不属于氧化危险品 This article does not belong to the oxidation of dangerous goods
毒害危险性 Toxic risk	该物品不属于毒害危险品 This article does not belong to the toxic dangerous goods
放射危险性 Radioactive risk	该物品不属于放射危险品 This article does not belong to the radiation of dangerous goods
腐蚀危险性 Mordant risk	该物品不属于腐蚀危险品 This article does not belong to the corrosion of dangerous goods
其他危险性	该电池瓦时率为 3.2kWh, 属于第九类危险品。

other risk	The watt-hour rate of the battery is 3.2kWh, which belong to the Class 9 dangerous goods.
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4. 急救措施

First aid measures

电池外壳破裂，内容物接触人体会产生危害，一旦发生接触，应采取以下应急措施：

Once battery shell rupture, content contact with the human body will produce harm, once contact, should take the following emergency measures:

眼睛：万一接触，立即用大量的清水冲洗至少 15 分钟，翻起上下眼睑，直到化学的残留物消失为止，迅速就医。

Eye: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

皮肤：万一接触，用大量水冲洗至少 15 分钟，同时除去污染的衣物和鞋子，迅速就医。

Skin: Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.

吸入：立即从暴露处移至空气清新处，如果呼吸困难给予输氧，立即就医。

Inhalation: Remove from exposure and move to fresh air immediately. Use oxygen if available.

食入：饮用两杯牛奶或水。如果当事人仍然清醒可以采取催吐的方法，并且立即就医。

Ingestion: Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician

5. 消防措施

Fire-fighting measures

燃点：不适用

Flash Point: N/A.

自燃温度：不适用

Auto-ignition Temperature: N/A.

灭火介质：大量水（降温），二氧化碳

Extinguishing Media: Water, CO₂.

特殊灭火程序：自给式呼吸器

Special Fire-Fighting Procedures

Self-contained breathing apparatus.

异常火灾或爆炸：当电芯暴露于过热的环境中时，安全阀可能会打开。

Unusual Fire and Explosion Hazards

Cell may vent when subjected to excessive heat-exposing battery contents.

燃烧产生的危险物品：一氧化碳，二氧化碳，锂氧化物烟气

Hazardous Combustion Products

Carbon monoxide, carbon dioxide, lithium oxide fumes.

6. 泄露应急处理

Accidental release measures

为防止电池材料泄露或释放采取的措施

如果电池内部材料泄露，操作人员应立刻撤离事故区直到烟气消散。将通风设备打开吹散危险性气体。用抹布擦净试验区，清除溢出的液体，将泄露电池放进塑料袋中，然后放进钢制容器。避免皮肤和眼睛接触或吸入有害气体。

Steps to be taken in case Material is Released or Spilled

If the battery material is released, remove operators from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

废弃物处置方法

建议将电池完全放电，锂金属电池消耗完电池内部的金属锂，并且交付给专业机构处理。

Waste Disposal Method

It is recommended to discharge the battery to the end. Use up the metal lithium inside the lithium metal battery, and delivered to professional institutions for further treatment.

7. 操作处置和储存 Handling and storage

禁止打开、毁坏或焚烧电池，因为电池有可能在这些处理过程中发生爆炸、破裂或泄露等事故。

禁止将电池短路、过充、强制放电或扔入火中。禁止挤压刺穿电池或将电池浸入溶液中。

The battery should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container.

Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire.

Do not crush or puncture the battery, or immerse in liquids.

操作处置和储存中的防范措施

禁止物理或电滥用，禁止高温储存，最好将电池储存在阴凉、干燥、通风及温度变化较小的环境中。禁止将电池接触加热设备或将电池直接暴露于阳光中。

Precautions to be taken in handling and storing

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

其他要注意的防范措施

拆解、挤压、直接放入火中或高温条件下，电池可能发生爆炸和燃烧。禁止短接或将电池正负极错误的安装在设备中。

Other Precautions

The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

8. 接触控制/个人防护 Exposure controls/personal protection

呼吸防护:

当电池排气阀打开时，应尽量使通风设备开至最大，避免将打开排气阀的电芯局限在某一狭窄空

间内。正常操作条件下，呼吸保护是不必要的。

Respiratory Protection

In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. Respiratory Protection is not necessary under conditions of normal use.

通风条件

正常使用条件下不必考虑。

Ventilation

Not necessary under conditions of normal use.

防护手套

正常使用条件下不必考虑。

Protective Gloves

Not necessary under conditions of normal use.

其他防护服装或设备

正常使用条件下不必考虑。

Other Protective Clothing or Equipment

Not necessary under conditions of normal use.

电池开阀试验时应做好个人防护

呼吸防护，防护手套，防护服装和有护边的安全玻璃罩都是要准备的。

Personal Protection is recommended for venting battery

Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

9. 物理和化学特性 Physical and chemical properties

外形：不规则形状

Appearance: Irregular shape

认证编号：RZUN2020-3789

Ref, No.: RZUN2020-3789

气味：泄漏时，有醚的气味。

Odour: If leaking, smells of medical ether.

酸碱度：不适用

pH: Not applicable as supplied.

闪点：针对单个组分暴露情况，其他不适用。

Flash Point: Not applicable unless individual components exposed.

易燃度：针对单个组分暴露情况，其他不适用。

Flammability: Not applicable unless individual components exposed.

相对密度：针对单个组分暴露情况，其他不适用。

Relative density: Not applicable unless individual components exposed.

溶解性（水溶性）：针对单个组分暴露情况，其他不适用。

Solubility (water): Not applicable unless individual components exposed.

溶解性（其他）：针对单个组分暴露情况，其他不适用。

Solubility (other): Not applicable unless individual components exposed.

10. 稳定性和反应活性 Stability and reactivity

稳定性：产品在第 7 节所述的条件下稳定。

Stability: Product is stable under conditions described in Section 7.

应避免的条件：加热 70°C 以上或焚烧、变形、毁坏、粉碎、拆卸、过充电、短路，长时间暴露在潮湿的条件下。

Conditions to Avoid : Heat above 70°C or incinerate. Deform. Mutilate. Crush. Disassemble. Overcharge. Short circuit. Expose over a long period to humid conditions.

应避免的材料：氧化剂，碱，水。

Materials to avoid: Oxidising agents, alkalis, water.

危险分解物：有毒烟雾，并可能形成过氧化物。

Hazardous Decomposition Products : Toxic Fumes, and may form peroxides.

聚合危害：不适用

Hazardous Polymerization : N/A.

如果发生泄露，避免与强氧化剂，无机酸，强碱，卤代烃接触。

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalies, halogenated hydrocarbons.

11. 毒理学资料 Toxicological information

标志及症状：无，除非电池破裂。

Signs & symptoms: None, unless battery ruptures.

内部物质暴露的情况下，蒸汽烟雾可能对眼睛和皮肤的刺激性。

In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.

吸入：对肺有刺激性。

Inhalation: Lung irritant.

皮肤接触：对皮肤刺激性。

Skin contact: Skin irritant.

眼睛接触：对眼睛有刺激性。

Eye contact: Eye irritant

食入：吞下中毒。

Ingestion: Poisoning if swallowed.

下列情况下会危害人员身体健康：如果与电池内部材料直接接触，皮肤可能会出现干燥、灼烧等轻微或严重的刺激，并且损坏靶器官的神经，肝脏和肾脏。

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to server irritation, burning and dryness of the skin may occur, Target organs nerves, liver and kidneys.

12. 生态学资料 Ecological information

对哺乳动物的影响：目前未知。

Mammalian effects: None known at present.

生态毒性：目前未知。

Eco-toxicity: None known at present.

生物体内积累：慢慢地生物降解。

Bioaccumulation potential: Slowly Bio-degradable.

环境危害：目前没有已知的环境危害。

Environmental fate: None known environmental hazards at present.

13. 废弃处置 Disposal consideration

禁止焚烧，或使电池温度超过 70°C，这种滥用可导致泄漏和/或电池爆炸。应按照相应的地方性法规处理。

Do not incinerate, or subject cells to temperature in excess of 70°C, Such abuse can result in loss of seal leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

14. 运输信息 Transport information

运输标签：第 9 类锂电池危险品标签，仅限货机标签

Label for conveyance: class 9 lithium battery hazard label, Cargo Aircraft Only Label

UN 编号: UN3480

UN Number: UN3480

包装等级: II

Packaging Group: II

EmS 编号: F-A,S-I

EmS No: F-A,S-I

海洋污染物: 无

Marine pollutant: No

正确的装运名称：锂离子电池（包括锂离子聚合物电池）

Proper Shipping name: Lithium-ion batteries (Including lithium-ion polymer batteries)

危害分类：货物符合《国际海运危险货物规则》包装导则 P903 (Amdt. 39-18) (2018 年版)，包括通过 UN38.3 测试手册要求。

Hazard Classification: The goods are complied with Packing Instruction P903 of IMDG CODE (Amdt. 39-18) (2018 Edition), including the passing of the UN38.3 test.

15. 法规信息 Regulation information

法律信息

Law information

《危险品规则》

《Dangerous Goods Regulations》

《对危险货物运输的有关规定的建议》

《Recommendations on the Transport of Dangerous Goods Model Regulations》

《国际海运危险货物规则》

《International Maritime Dangerous Goods》

《危险货物物品名表》

《List of dangerous goods》

《欧洲道路危险货物国际运输协议》

《European Agreement concerning the International Carriage of Dangerous Goods by Road》

《危险品安全运输技术指令》

《Technical Instructions for the Safe Transport of Dangerous Goods》

《危险货物分类和品名编号》

《Classification and code of dangerous goods》

《职业安全卫生法》

《Occupational Safety and Health Act》 (OSHA)

《有毒物质控制法》

《Toxic Substance Control Act》 (TSCA)

《消费产品安全法》

《Consumer Product Safety Act》 (CPSA)

《联邦环境污染控制法》

《Federal Environmental Pollution Control Act》 (FEPCA)

《石油污染法案》

《The Oil Pollution Act》 (OPA)

《超级基金修正案和再授权法案Ⅲ(302/311/312/313)》

《Superfund Amendments and Reauthorization Act TitleⅢ (302/311/312/313)》 (SARA)

《资源保护及恢复法案》

《Resource Conservation and Recovery Act》 (RCRA)

《安全饮用水法》

《Safety Drinking Water Act》 (CWA)

《加州 65 提案》

《California Proposition 65》

《美国联邦法规》

《Code of Federal Regulations》 (CFR)

根据所有联邦、州和地方法律。

In accordance with all Federal, State and local laws.

16. 其他信息

Other information

本文件仅对由委托方阳光电源股份有限公司提供的，并由阳光电源股份有限公司生产的电池（SMR032）有效。该电池的成分信息由委托方提供并承诺其完整性和准确性。用户应仔细阅读此文件，并按照正确的方法使用电池，如因电池使用不当造成的损害或损失，威凯检测技术有限公司（CVC）不承担任何责任。

This file is only effective to the batteries (SMR032) provided by commissioner SUNGROW POWER SUPPLY Co., Ltd., which manufactured by SUNGROW POWER SUPPLY Co., Ltd.. The commissioner provides the composition information of batteries, and promises its integrity and accuracy. Users should read this file carefully, and use the batteries in correct method. Vkan Certification & Testing Co., Ltd. (CVC) doesn't assume responsibility for any damage or loss because of misuse of batteries.

注 意 事 项

Important

1. 本报告无检测单位印章无效。
The test report is invalid without the official stamp 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.

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。

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邮政编码(Post Code): 510663

E—mail: office@cvc.org.cn

http: //www.cvc.org.cn



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CNAS L0095

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TEST REPORT

No.: GJW2019-5357

Client : Ruipu Energy Co., Ltd.
: Address: No.205, Binhai 6th Road, Konggang New District, Longwan District, Wenzhou, Zhejiang, China

Manufacturer : /

Factory : /

Receiving Date : 2019-11-21 Completing Date : 2019-11-27

Test Sample : Rechargeable Prismatic Lithium-ion Cell Sample Description : /

Type/Model : CB3914895EA

Test Items : The content of Lead, Cadmium, Mercury

Test Criterion : 2013/56/EU

Test Method : IEC 62321-4:2013, IEC 62321-5:2013

Description of the deviation from the standard, if any : No deviation

Test Conclusion : The results comply with the limits of Directive 2013/56/EU

Lu Yating
Tested by: *Lu Yating*

Zhou Ye
Reviewed by: *Zhou Ye*

Xia Qingyun
Approved by: *Xia Qingyun*

Title: Director of Engineering
Date of issue: 2019-11-27



Vkan Certification & Testing Co., Ltd.

List of Apparatus					
No.	Test Instrument	Type	Number	Period of Calibration Validity	Used (√)
1	ICP-OES	Optima 8300	VGDY-0137	2021.04.17	√
2	Analytical Balance	XS204	VGDY-0127	2020.04.05	√

Test Result

Test Items	Unit	MDL	Requirement	Result
				Rechargeable Prismatic Lithium-ion Cell
Lead (Pb)	%	0.0002	≤ 0.004	N.D.
Cadmium (Cd)	%	0.0002	≤ 0.002	N.D.
Mercury (Hg)	%	0.0002	≤ 0.0005	N.D.

Remarks: "N.D." means "Not Detected" , "MDL" means "Method Detection Limit" .

Sample Photos



Remark: /

-----End of Report-----

This test report is responsible for the tested samples only. The test report is invalid without the official stamp of CVC. This report shall not be reproduced, except in full. The test report is invalid if altered. Objections to the test report must be submitted to CVC within 15 days.

Vkan Certification & Testing Co., Ltd.

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Tel: +86-20-32293888 FAX: +86-20-32293889

E-mail: office@cvc.org.cn http:// www.cvc.org.cn



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CNAS L0095

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No.: RZUN2020-3789

检测报告

TEST REPORT

UN38.3

NAME OF SAMPLE:

Lithium Battery Module

产品名称:

锂离子电池模组

CLIENT:

SUNGROW POWER SUPPLY Co., Ltd.

委托单位:

阳光电源股份有限公司

CLASSIFICATION OF TEST:

Commission Test

检测类别:

委托测试

威凯检测技术有限公司
Vkan Certification & Testing Co., Ltd.




检验检测专用章

检测报告

TEST REPORT

No.:RZUN2020-3789

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Name of samples: Lithium Battery Module 样品名称:锂离子电池模组	Type/Model: 型号规格: SMR032 64V 50Ah 3,2kWh
Color: White 样品颜色:白色	Physical shape: Irregular shape 样品形状: 不规则形状
Commissioned by: SUNGROW POWER SUPPLY Co., Ltd. 委托单位: 阳光电源股份有限公司	Manufacturer: SUNGROW POWER SUPPLY Co., Ltd. 制造商: 阳光电源股份有限公司
Commissioner address:No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P. R. China. 委托单位地址:合肥市高新技术开发区习友路 1699 号	Manufacturer address:No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P. R. China. 制造商地址: 合肥市高新技术开发区习友路 1699 号
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.6/Amend.1/Section 38.3	Sample identification: 样品标识序号:b1#~b4#, c1#~c30#
Receiving date: 接样日期: 2020-08-21	Means of receiving: Submitted by commissioner 接样方式: 委托单位送样
Completing date: 完成日期: 2020-09-24	Test item: 7 items 测试项目: 7 项
<p>Test conclusion: 检测结论:</p> <p>The Lithium Batteries Module submitted by SUNGROW POWER SUPPLY Co., Ltd. are tested according to Section 38.3 of the Sixth revised Edition Amendment 1 of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3). The test items are full items. The test results comply with the relevant requirements of the standard.</p> <p>由阳光电源股份有限公司送检的锂离子电池模组, 依据《关于危险货物运输的建议书》试验和标准手册第六修订版修正 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。</p> <div style="text-align: center;">  <p>Seal of CVC CVC 印章 检测检测专用章 签发日期:2020.09.25</p> </div>	

Title: Manager
批准人职务: 经理

Approved by:

Reviewed by:

Tested by:

批准:

Huangkun

审核:

zhangsiyao

检测:

Wei Guohua

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。

Cell Dimensions/电芯尺寸: -

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.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	-

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.

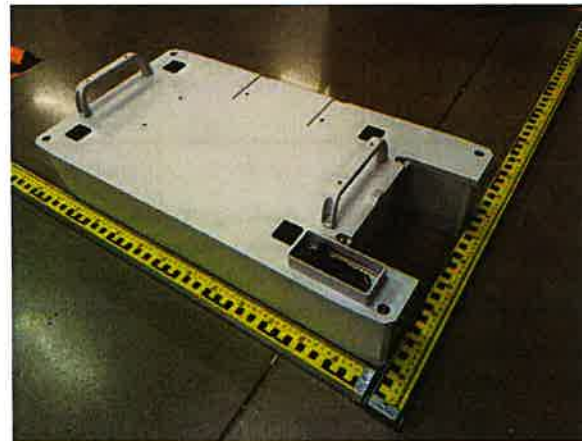
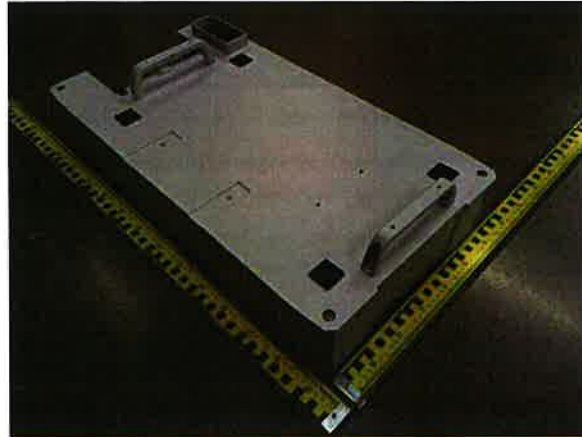
本报告中以逗号代替小数点。

The Batteries have not equipped with overcharge protection. According to commissioner, the batteries are designed for use only in equipments, Which affords such protection, According to the UN38.3 standard, the sample is not subject to the requirements of overcharge.

该电池未安装过度充电保护装置, 根据委托方声明, 该样品仅设计用于设备中, 设备上带有过度充电保护装置, 根据 UN38.3 要求, 无需做过度充电试验。

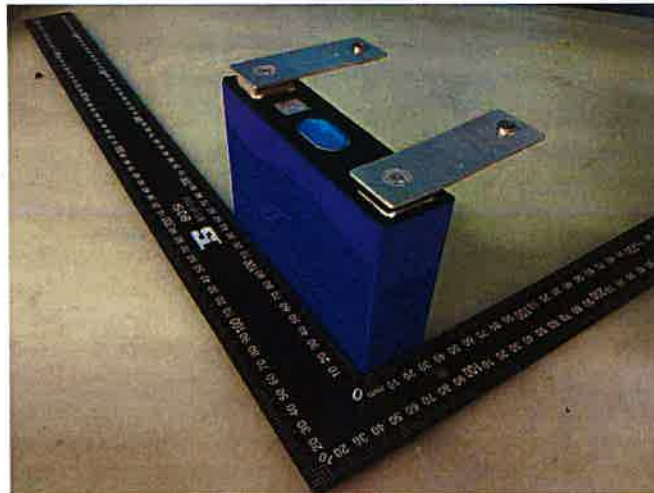
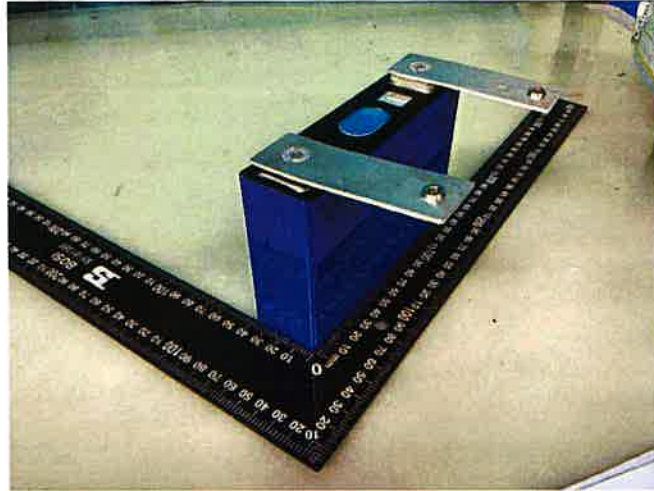
Photos of Samples and Labels/样品照片及标识

Battery/电池 (SMR032 64V 50Ah 3,2kWh)



Photos of Samples and Labels/样品照片及标识

Inner Cell/内部电芯 (CB3914895EA 3,2V 50Ah)



ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	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
	<p>Test cells and batteries shall be stored at a pressure of 11,6kPa or less for at least six hour at ambient temperature (20±5°C)/ 将电芯和电池在温度为 20±5°C, 大气压力为不大于 11,6kpa 的环境中贮存不少于 6 个小时</p> <p>Requirement/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>	<p>The samples b1#~b4# :</p> <p>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</p> <p>The data is shown in Table 1./数据见表 1</p>	
38.3.4.2	Test T.2: Thermal test/试验 T. 2: 温度试验		P
	<p>Test cells and batteries are to be stored for/电池存储条件如下:</p> <p>1 For small cells and batteries: one temperature cycle: 72±2°C(6h) —40±2°C(6h) /对于小型电芯和电池: 一次温度循环为 72±2°C(6h) —40±2°C(6h)</p> <p>For large cells and batteries: one temperature cycle: 72±2°C(12h) —40±2°C(12h) /对于大型电芯和电池: 一次温度循环为 72±2°C(12h) —40±2°C(12h)</p> <p>2 The maximum time interval between test temperature extremes is 30 minutes/温度转换最大间隔时间为 30min</p> <p>3 This procedure is to be repeated 10 times/重复 10 次循环</p> <p>4 after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5°C)/循环结束后, 电池在 20±5°C的条件下搁置 24 小时</p>	<p>The samples b1#~b4# :</p> <p>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</p> <p>The data is shown in Table 1./数据见表 1</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>	<p>The samples b1#~b4# :</p> <p>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</p> <p>The data is shown in Table 1./数据见表 1</p>	

ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	Verdict 判定
38.3.4.3	<p>Test T.3: Vibration/试验 T. 3: 振动</p> <p>1 Cells and batteries are firmly secured to the platform of the vibration machine /电芯和电池牢固地安装在振动台（的台面）上</p> <p>2 The vibration: a sinusoidal waveform with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15 minutes/振动以正弦波形式，以 7Hz 增加至 200Hz，然后在减少回到 7Hz 为一个循环，一个循环持续 15 分钟的对数前移传送。</p> <p>3 For cells and small batteries: from 7 Hz a peak acceleration of 1g_n is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8g_n occurs (approximately 50Hz). A peak acceleration of 8g_n is then maintained until the frequency is increased to 200Hz. / 对于电芯和小型电池：从 7Hz 开始，以 1g_n 的峰值加速度保持不变，直到达到 18Hz。然后将振幅保持在 0.8mm（总偏移 1.6mm）并且频率增加直到出现 8g_n 的峰值加速度（大约 50Hz）。然后保持 8g_n 的峰值加速度，直到频率增加到 200Hz。</p> <p>For large batteries: from 7Hz a peak acceleration of 1g_n is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 2g_n occurs (approximately 25Hz). A peak acceleration of 2g_n is then maintained until the frequency is increased to 200Hz. / 对于大型电池：从 7Hz 开始，以 1g_n 的峰值加速度保持不变，直到达到 18Hz。然后将振幅保持在 0.8mm（总偏移 1.6mm）并且频率增加直到出现 2g_n 的峰值加速度（大约 25Hz）。然后保持 2g_n 的峰值加速度，直到频率增加到 200Hz。</p> <p>4 This cycle repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting position of the cell. One of the directions of vibration must be perpendicular to the terminal face. /以振动的其中一个方向必须是垂直样品极性，对每个电芯从三个互相垂直的方向上循环 12 次，每个方向 3 个小时，共 9 小时。</p>		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>	<p>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</p>	

ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	Verdict 判定
38.3.4.4	<p>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 gn 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
	<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>	<p>The samples b1#~b4# : Acceleration= 30.3g_n No leakage, no venting, no disassembly, no rupture and no fire/编号为 b1#~b4#的样品: 峰值加速度= 30.3g_n 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</p>	

ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	Verdict 判定
38.3.4.5	Test T.5: External Short Circuit/试验 T.5 外部短路		P
	<p>1The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57±4°C/保持试验环境温度稳定在 57±4°C，以使电芯或电池样品外表温度达到 57±4°C</p> <p>2 the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0,1 ohm at 57±4°C, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57±4°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. /将样品正负极用小于 0,1Ω 的总电阻回路进行短路，样品的外表温度恢复到 57±4°C之后保持短路状态 1 小时以上；对于大电池，电池温度降低至最高温升值的一半时实验结束。</p> <p>3 the cell or battery must be observed for a further six hour for the test to be concluded, /对电芯或电池必须进一步观察 6 个小时才能下结论。</p>		
	<p>Requirements/标准要求: During the test and within six hours after test ,the cells or batteries 在试验过程中以及之后 6 个小时内，电芯或电池样品</p> <p>1. External temperature not exceed 170°C 外表温度不超过 170°C</p> <p>2. No disassembly, no rupture and no fire. 无解体、无破裂和无着火现象发生。</p>	<p>The samples b1#~b4# : no disassembly, no rupture and no fire/编号为 b1#~b4# 的样品：无解体、无破裂以及无着火现象</p> <p>The data is shown in Table 1./数据见表 1</p>	

ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	Verdict 判定
38.3.4.6	<p>Test T.6: Impact / Crush / 试验 T.6: 撞击/挤压</p> <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> <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</p> <p>2 A 15,8 mm diameter bar is to be placed across the center 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 的横木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。</p> <p>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。</p>	-	P
	<p>Requirements/标准要求:</p> <p>1 Cells external temperature not exceed 170°C.电芯或电池的最高表面温度应不超过 170°C</p> <p>2 No disassembly, no fire within six hours of this test</p> <p>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</p>		N/A
38.3.4.6	<p>Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter)</p> <p>/ 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)</p> <p>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:</p> <p>(a) The applied force reaches 13 kN ± 0,78 kN. / 施加的力达到 13 千牛±0,78 千牛</p> <p>(b) The voltage of the cell drops by at least 100 mV./电池的电压下降至少 100 毫伏</p> <p>(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。</p> <p>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。</p>		P
	<p>Requirements/标准要求:</p> <p>1 Cells external temperature not exceed 170°C.电芯或电池的最高表面温度应不超过 170°C</p> <p>2 No disassembly, no fire within six hours of this test</p> <p>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</p>	<p>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</p> <p>The data is shown in Table 2./数据见表 2</p>	

ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3			
Clause 章节	Requirements 标准要求	Result 试验结果	Verdict 判定
38.3.4.7	Test T.7: Overcharge/试验 T. 7: 过度充电		N/A
	1 The charge current shall be twice the manufacturer's recommended maximum continuous charge current/以 2 倍制造厂推荐的最大持续充电电流对样品充电 2 The minimum voltage of the test shall be as follows/本试验最小电压为:		
	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/ 如果厂家推荐的充电电压不超过 18V, 本试验的最小充电电压应是厂家标定最大充电电压的两倍或者是 22V 之中的较小者。 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/ 如果厂家推荐的充电电压超过 18V, 本试验的最小充电电压应是厂家标定最大充电电压的 1,2 倍。 3 Tests are to be conducted at ambient temperature 20±5°C, The duration of the test shall be 24 hours/20±5°C 的环境下, 试验持续 24 小时。		
	Requirements/标准要求: No disassembly and no fire within seven days of this test 试验样品在试验中和试验后 7 天内, 应无解体和无着火现象发生。		
38.3.4.8	Test T.8: Forced discharge/试验 T. 8: 强制放电		P
	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, 20±5°C 的环境下, 将单个电芯连接在 12V 的直流电源上进行强制放电, 此直流电源提供给每个电芯初始电流为制造厂指定的最大放电电流。		
	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) 指定的放电电流通过串联在试验电芯上的合适大小和功率的负载来获得, 每个电芯的强制放电时间 (小时) 为额定容量除以初始电流 (安培)。		
Requirements/标准要求: No disassembly and no fire within seven days of this test 试验样品在试验中和试验后 7 天内, 应无解体和无着火现象发生。		The samples c11#~c30#: no disassembly and no fire/ 编号为 c11#~c30#的样品: 无解体、无着火现象 The data is shown in Table 3./数据见表 3	

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(%)	Change ratio 电压比(%)	Mass loss(%) 质量损失(%)	Change ratio 电压比(%)	Mass loss(%) 质量损失(%)	Change ratio 电压比(%)	Mass loss(%) 质量损失(%)	Change ratio 电压比(%)	Temp. (°C) 温度 (°C)
b1#	32,72	66,890	0,000	99,96	0,000	99,72	0,000	99,99	0,000	99,98	57,4
b2#	32,73	67,020	0,000	99,78	0,000	99,73	0,000	99,99	0,000	99,99	57,7
b3#	32,58	66,900	0,000	99,94	0,000	99,73	0,000	99,99	0,000	99,99	57,6
b4#	33,35	66,980	0,000	99,85	0,000	99,72	0,000	99,97	0,000	99,99	57,9

Test T.6: Crush / 试验 T.6: 挤压	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)	3,296	3,292	3,299	3,296	3,298	3,292	3,291	3,297	3,295	3,294
	Temp. (°C) / 温度 (°C)	24,2	24,1	24,4	24,0	24,3	24,1	24,3	24,5	24,2	24,0

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)	2,801	2,814	2,818	2,809	2,807	2,808	2,821	2,804	2,812	2,811
	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)	2,802	2,821	2,819	2,815	2,805	2,818	2,813	2,803	2,819	2,820

注 意 事 项 Important

1. 报告无检测单位印章无效。
The test report is invalid without the official stamp of CVC.
2. 未经本实验室书面同意，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。

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