

## Test Report

Report No. : TCT220722C055

Date : Aug. 05, 2022

Page No.: 1 of 4

**Applicant:** Ningbo Yifan Electric Appliance Co., LTD  
**Address:** Building 8, Small Appliances Pioneer Park, Wanghai Industrial Park, Xidian Town, Ninghai County, Ningbo City

**The following sample was submitted and identified by/on behalf of the client as:**

**Sample Name:** Lithium-ion Rechargeable Cell  
**Model No.:** 18650 3.7V 1500mAh  
**Manufacturer:** Huizhou Juxingyuan Industrial Co., Ltd.  
**Address:** Building A, Lanshukeng, Hongwei Village, Xinxu Town, Huiyang District, Huizhou City, Guangdong Province, China  
**Sample Received Date:** 2022.07.22  
**Testing Period:** 2022.07.22-2022.08.05  
**Test Requested:** Accordance with Directive 2006/66/EC, to determine the Lead (Pb), Cadmium (Cd), Mercury (Hg) contents of the submitted sample(s).  
**Test Method:** Please refer to the following page(s).  
**Test Result(s):** Please refer to the following page(s).  
**Conclusion:** Test results of submitted sample(s) comply with the limit set by Directive 2006/66/EC and its amendment 2013/56/EU.

Checked by

Approved by



Justin



Tomsin



# Test Report

Report No. : TCT220722C055

Date : Aug. 05, 2022

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## Test Results:

### Lead, Cadmium and Mercury Content(s)

Test Method: With reference to IEC62321-4:2013+AMD1:2017, IEC 62321-5:2013

Analysis was performed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)

Test Items	Unit	MDL	Labelling Requirement <sup>#</sup>	Permissible Limit	Test Results
Lead (Pb)	%	0.0010	> 0.004	--	N.D.
Cadmium (Cd)	%	0.0010	> 0.002	0.002 <sup>##</sup>	N.D.
Mercury (Hg)	%	0.0001	> 0.0005	0.0005	N.D.

### Specimen Description:

Battery

- Note :
- MDL = Method Detection Limit
  - N.D.= Not Detected(<MDL)
  - 1mg/kg= 1ppm = 0.0001%
  - "--"=Not Regulated
  - <sup>#</sup> = According to the article 21.3, batteries, accumulators and button cells containing more than 0,0005 % mercury, more than 0,002 % cadmium or more than 0,004 % lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb.
  - <sup>##</sup> = Not apply to portable batteries and accumulators intended for use in:
    - (a) emergency and alarm systems, including emergency lighting;
    - (b) medical equipment.
  - According to the article 21.1, all batteries, accumulators and battery packs should be appropriately marked with the crossed-out wheeled bin symbol.

Remark: - Results shown is/are of total weight of the battery sample.

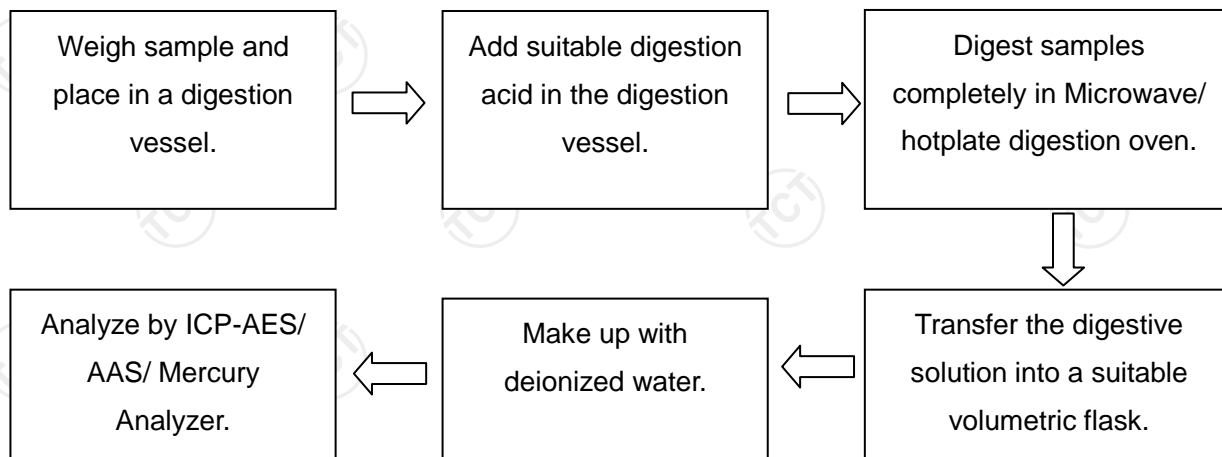
## Test Report

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### Test Chart:



## Test Report

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### Photo(s) of the sample(s)



\*\*\* End of Report \*\*\*

*Remark: This report is considered invalidated without the Special Seal for Inspection of the TCT. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of TCT, this test report shall not be copied except in full and published as advertisement.*





中国认可  
检验  
INSPECTION  
CNAS IB0078

危险物品  
DANGEROUS GOODS

仅限货机运输

## 航空运输条件鉴别报告书

### Identification and Classification Report for Air Transport of Goods

报告编号:

PEKSZ202201051963PXY850001

Issued No.:

生效日期:

2022. 01. 06

Effective Date:

委托单位:

惠州市聚鑫源实业有限公司

Applicant:

Huizhou Juxingyuan Industrial Co., Ltd.

物品名称:

锂离子可充电电芯 JXY 18650 1500mAh 5.55Wh 3.7V

Name of Goods:

Lithium-ion Rechargeable Cell JXY 18650 1500mAh 5.55Wh 3.7V

北京迪捷姆空运技术开发有限公司

Beijing DGM Air Transport Technology Development Co., Ltd.





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The report is issued by DGM China according to IATA *Dangerous Goods Regulations* published in the current year and the information of the goods and the information of its shipping provided by the applicant (shipper or his agent).

2. 依据鉴别的需要，本公司要求委托人提供真实、完整的货物样品及资料。

According to the demand of identification and classification, DGM China requires the applicant to provide true and exact sample and data of the cargo.

3. 委托人保证申报的物品和/或提供的样品与交运的货物是同一种物质。

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4. 本公司仅对样品的鉴别结果负责。

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This report will be effective only after it is signed by the inspector, checker and approver, and stamped by DGM China.

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This report is only valid within the year in which the IATA *Dangerous Goods Regulations* is effective.

地址：北京首都国际机场货运北路天竺综合保税区BGS货运楼249室

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电话：010-69479673

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网址：[www.dgmchina.com.cn](http://www.dgmchina.com.cn)

E-mail: [test@dgmchina.com.cn](mailto:test@dgmchina.com.cn)









项目编号 Item No.		PEKSZ202201051963			
物品名称 Name of Goods	中文 Chinese	锂离子可充电电芯 JXY 18650 1500mAh 5.55Wh 3.7V			
	英文 English	Lithium-ion Rechargeable Cell JXY 18650 1500mAh 5.55Wh 3.7V			
鉴别结论 Conclusions		<p>该货物为锂离子/聚合物电芯，单独包装。额定瓦特小时为5.55Wh。已通过 UN38.3 测试，已通过包装件1.2米跌落试验，每个包装件上均有锂电池标记。</p> <p>参考有关资料，根据DGR有关规定，该物质分类识别为第9类（或项）危险品，UN3480。 This goods is lithium ion/polymer cell,packed individually.Watt-hour rating is 5.55Wh.Each battery is of a type proved to meet the Requirements of each test in the UN MANUAL OF TESTS AND CRITERIA, Part III,sub-section 38.3,Each package is capable of withstanding a 1.2m drop test in any orientation without damage to the cells contained therein, without shifting of the contents so as to allow cell to cell contact and without release of contents,Each package is marked with lithium battery mark.</p> <p>According to IATA DGR this substance is classified as dangerous goods Class (or division)9,UN3480.</p>			
建议运输 条件 Suggestion for Transport Condition	UN/ID 编号 UN/ID No.	运输专用名称 Proper Shipping Name		类或项 Class or Div. (次要危险性) (Subsidiary Risk)	包装等级 Packing Group
	UN3480	Lithium ion batteries		9	/
	包装说明 Packing Inst.	客货机 Passenger and Cargo Aircraft	Forbidden		
		仅限货机 Cargo Aircraft only	965 IB		
	注意事项 Remarks	每一单电芯必须做好防短路措施，并装入坚固外包装内。 each single cell must be packed in such a way as to prevent short circuits under the normal conditions and packed in strong outer packing.			
主检员 Prepared by:		审核人 Checked by:		批准人 Approved by:	
曾平平		1 王明		杨明	
				报告单位（盖章） Stamp	
				DGM-CHINA	

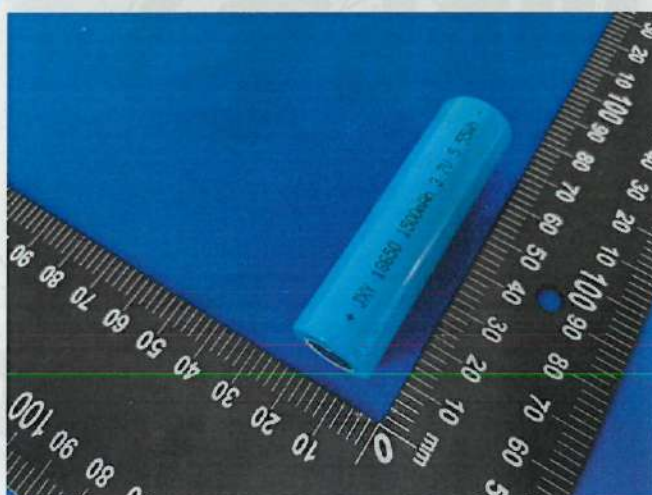
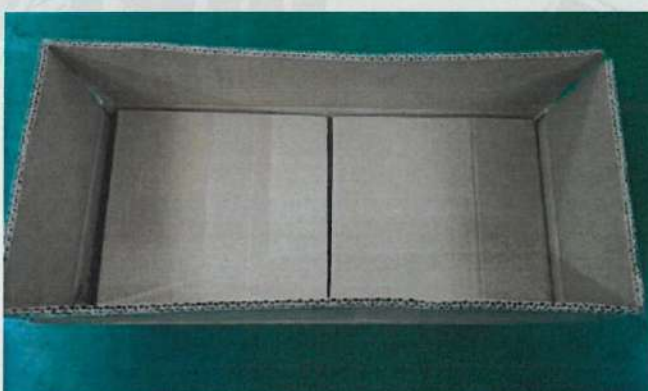
制单： 彭新玉





# 锂离子可充电电芯 JXY 18650 1500mAh 5.55Wh 3.7V

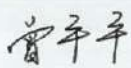

PEKSZ202201051963





# 锂电池 UN38.3 试验概要 Lithium Battery Test Summary

项目编号: PEKSZ202201051963

单位信息 Company Information					
委托单位 Consignor	惠州市聚鑫源实业有限公司 惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A) 电话/Tel: 0752-3339150 邮箱/Mail: 289126701@qq.com 网址/Website:/				
生产单位 Manufacturer	惠州市聚鑫源实业有限公司 惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A) 电话/Tel: 0752-3339150 邮箱/Mail: 289126701@qq.com 网址/Website:/				
测试单位 Test Lab	深圳市通测检测技术有限公司 中国广东省深圳市宝安区福永桥头亿宝来工业城 1 栋 1 层 B 电话/Tel: 86-755-27673339 邮箱/Mail: tom@tct-lab.com 网址/Website: www.tct-lab.com				
电池信息 Battery Information					
名称 Name	锂离子可充电电芯 Lithium-ion Rechargeable Cell	电池/电芯类别 Battery/Cell Classification		电芯 Cell	
型号 Type	JXY 18650 1500mAh	商标 Trademark		/	
额定电压 (V) Normal Voltage (V)	3.7V	额定容量 (mAh) Rated Capacity (mAh)		1500mAh	
额定能量 (Wh) Watt-hour rating (Wh)	5.55Wh	外观/Appearance		蓝色圆柱形 Blue Cylindrical	
质量 (g)/Mass (g)	39.8g	锂含量 (g)/Li Content (g)		N/A	
测试信息 Test Information					
测试报告编号 Test Report Number	TCT200414B053	测试报告签发日期 Date of Test Report		2020/4/24	
测试标准 Edition of UN Manual of Tests and Criteria Used	《联合国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 (ST/SG/AC.10/11/Rev.6 Amend.1) UNITED NATIONS "Recommendations on the Transport of Dangerous Goods Manual of Test and Criteria" Sixth revised edition Amendment 1 (ST/SG/AC.10/11/Rev.6 Amend.1)				
T.1: 高度模拟 Altitude Simulation	通过 Pass	T.2: 温度试验 Thermal Test	通过 Pass	T.3: 振动 Vibration	通过 Pass
T.4: 冲击 Shock	通过 Pass	T.5: 外部短路 External Short Circuit	通过 Pass	T.6: 撞击/挤压 Impact/Crush	通过 Pass
T.7: 过度充电 Overcharge	N/A	T.8: 强制放电 Forced Discharge	通过 Pass		
UN38.3.3(f)	N/A		UN38.3.3(g)	N/A	
签名 Signatory 职务 Title	 检验员		签发日期 Issued Date	2022.01.04 	

此打有效

此打有效




非限制性货物  
UNRESTRICTED GOODS此报告本年度有效  
有效期2022年12月31日

Rep.No.:TSZ21120073-P02-R02

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## 货物运输条件鉴定报告书

## Report for Safe Transport of Goods

 海运 By Sea	非限制性货物 Unrestricted Goods
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Name of sample:

Lithium-ion Rechargeable Cell

产品名称:

锂离子可充电电芯

Model/型号规格:

JXY 18650 1500mAh

Client:

Huizhou Juxingyuan Industrial Co., Ltd.

委托单位:

惠州市聚鑫源实业有限公司

Classification:

Commission Test

检测类别:

委托测试

Shenzhen Tiansu Calibration and Testing Co., Ltd

深圳天溯计量检测股份有限公司

B/1,4, NO.2 Jinlong Road, Longgang District, Shenzhen, China

深圳市龙岗区宝龙街道锦龙大道2号1栋、4栋

Web: www.tiansu.org

E-mail: tsjc@tiansu.org

Tel: 0755-89457984

STOG



TS(SZ)-J3-009-001-A1

委托信息	Commissioned Information	
Commissioned by 委托单位	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司	
Commissioner address 委托单位地址	A1 102, Yinxing Technology Building, No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen P.R.China 惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A)	
Manufacturer 生产单位	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司	
Manufacturer address 生产单位地址	A1 102, Yinxing Technology Building, No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen P.R.China 惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A)	
样品信息	Sample Information	
Name of samples 样品名称	Lithium-ion Rechargeable Cell 锂离子可充电电芯	
Battery Category 电池类别	Lithium ion Batteries 锂离子电池	
Type\Mode 型号规格	JXY 18650 1500mAh	
Sample Parameters 样品参数(容量\能量\电压)	1500mAh/5.55Wh/3.7V	
包装件信息	Package Information	
Package Appearance 包装件外观	Prismatic 棱柱形	
Package Size 包装件尺寸	T(170mm)*W(220mm)*L(410mm)	
Package Weight 包装件重量	8.5kg	
Package batteries net weight 包装件电池净重	8.0kg	
Battery quantity in each package 每个包装件内电池个数	200PCS	
Equipment Information 设备信息	Equipment Name: - 设备名称: -	Type\Mode: - 设备型号: -
鉴定依据	Inspection refer to	
Inspection refer to 鉴定依据	IMDG CODE(Amdt.40-20) Edition. 国际海运危险货物运输规则	
鉴定结论	Certification	
Proper Shipping name 运输名称	Lithium ion Batteries 锂离子电池	
Hazards identification 危险品识别	None 无	
packing group standards 包装等级要求	The gross weight of the package does not exceed 30kg. 包装件毛重不超过 30kg.	
Seal/检验专用章: Date of issue:Jan. 1,2022		

批准  
Approved by

段江清

审核  
Reviewed by

邱伟超

主检  
Tested by

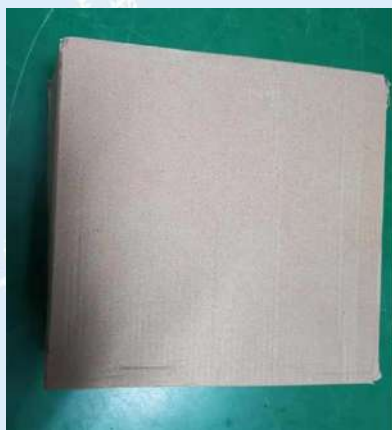
徐志龙



编号	鉴别项目	鉴别结果
1	Watt-hour rating of the battery is 5.55Wh. 该电池额定瓦特小时数为 5.55 瓦时。	≤20Wh
2	The Lithium cells/batteries listed in the report are of type proven to meet the requirements of each test in the UN Manual of Tests and Criteria Part III subsection 38.3. The UN38.3 test report No. is TCT200414B053. 本报告所述锂电池已经通过联合国《关于危险货物运输的建议书》第 38.3 节的相关测试要求。 UN38.3 测试报告编号: TCT200414B053.	Conform 符合
3	Batteries be manufactured under a quality management programme. 电池按照规定的质量管理体系进行制造。	Conform 符合
4	The lithium batteries don't belong to batteries returned to the manufacturer for safety reasons, are not waste lithium batteries and not lithium batteries being shipped for recycling or disposal. 该锂电池不属于召回电池, 不属于废弃和回收电池。	Conform 符合
5	Each package is capable of withstanding a 1.2m drop test in any orientation. The test report No.:TCT200414D053. 通过包装件 1.2 米跌落试验, 测试报告编号: TCT200414D053.	Conform 符合
6	The package must be appropriately marked according to special provision 188. 包装件需要按照特殊规定 188 的要求进行适当标记。	Conform 符合
7	Each consignment is accompanied with a document with an indication that: the package contains lithium ion cells or batteries, the package must be handled with care, and that a flammability hazard exists if the package is damaged; special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and a telephone number for additional information. 每票托运货物均有随附文件说明: 包装件内装锂离子电芯或电池, 必须小心操作, 如包装件破损, 有易燃危险性; 包装件破损时应采取的特殊措施, 包括检查和必要时的重新包装; 紧急联系电话号码。	Conform 符合
8	Cells and batteries are properly protected so as to prevent short circuits. 锂电池具有适当的防短路措施。	Conform 符合
9	Cells and batteries are properly protected so as to secured against movent within the outer package. 锂电池有适当的保护措施防止其在包装件内移位。	Conform 符合

Photos of Samples

样品照片





## STATEMENTS

## 声 明

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本报告无检测单位印章无效。
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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。
6. The test report is valid for the tested samples only.  
本报告仅与送检样品有关。

-----报告结束-----

Report No.: TSZ21120073-P02-R01  
报告编号Page 1 of 12  
第 1 页 共 12 页

## Material Safety Data Sheet

## 材料安全数据表

Product Name : Lithium-ion Rechargeable Cell  
产品名称 : 锂离子可充电电芯

Model : JXY 18650 1500mAh  
型号

Client Name : Huizhou Juxingyuan Industrial Co., Ltd.  
委托单位

Address : Block A,3rd Floor,Building A,No.3 gongye Road,Shitoushan  
地址 : Brick Factory,Zhoushi Road,Shixin Community,Shiyan  
Street,Baoan District,Shenzhen  
惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A)

Date : Jan. 1,2022  
日期 : 2022 年 1 月 1 日

Shenzhen Tiansu Calibration and Testing Co.,Ltd  
深圳天溯计量检测股份有限公司Shenzhen Tiansu Calibration and Testing Co.,Ltd  
深圳天溯计量检测股份有限公司B/1,4, NO.2 Jinlong Road, Longgang District, Shenzhen, China  
深圳市龙岗区宝龙街道锦龙大道 2 号 1 栋、4 栋

Web: www.tiansu.org

E-mail: tsjc@tiansu.org

Tel: 0755-89457984

MSDS



J3-2021-A01-0011



**MATERIAL SAFETY DATA SHEET****材料安全数据清单****1. Chemical Product and Company Identification产品及申请公司信息**

Sample name: Lithium-ion Rechargeable Cell  
样品名称 锂离子可充电电芯

Sample model: JXY 18650 1500mAh  
样品型号

Rating: Nominal Voltage 标称电压: 3.7V  
规格 Rated Capacity 额定容量: 1500mAh, 5.55Wh  
Weight 重量: 39.8g

Manufacturer: Huizhou Juxingyuan Industrial Co., Ltd.  
制造商 惠州市聚鑫源实业有限公司

Address: Block A,3rd Floor,Building A,No.3 gongye Road,Shitoushan  
制造商地址 Brick Factory,Zhoushi Road,Shixin Community,Shiyan  
Street,Baoan District,Shenzhen  
惠州市惠阳区新圩镇红卫村榄树坑 (厂房 A)

Telephone no: 0752-3339150  
联系电话

E-mail: 289126701@qq.com  
邮箱

Date of received: Dec. 10, 2021  
接收日期 2021 年 12 月 10 日

Date of report: Jan. 1,2022  
报告日期 2022 年 1 月 1 日

Written by: 魏雅静  
编写

Approved by: 批准



## 2. Hazards Summarizing 危险概述

**Danger sort 危险类别:** N/A

**Routes of entry 进入途径:**

1. Eyes and Skin – When leaking, the electrolyte solution contained in the battery irritates to ocular tissues and the skin.  
眼睛和皮肤 – 当电池泄漏时, 电池内部的电解液会刺激眼膜和皮肤, 甚至有疼痛感。
2. Inhalation—Respiratory (and eye) irritation may occur if fumes are released due heat or an abundance of leaking batteries.  
吸入 – 电池大量泄漏产生热量导致冒烟, 吸入会刺激呼吸系统。
3. Ingestion – The ingestion of the battery can be harmful. Content of open battery can cause serious chemical burns of mouth, esophagus and gastrointestinal tract.  
吞食 – 吞食电池对身体有很大伤害。电池里含的物质会引起嘴、食道和胃肠道 化学灼伤。

**Health harm 健康损害:**

Exposure to leaking electrolyte from ruptured or leaking battery can cause 电池破裂导致电解液外漏会导致以下伤害:

1. Inhalation—Burns and irritation of the respiratory system, coughing, wheezing, and shortness of breath.  
吸入—灼伤或刺激呼吸系统, 可能会产生咳嗽、喘息和呼吸浅短等现象。
2. Eyes—Redness, tearing, burns. The electrolyte is corrosive to all ocular tissues.  
眼睛—红肿, 疼痛, 灼伤。电解液会腐蚀视网膜。
3. Skin—The electrolyte is corrosive and causes skin irritation and burns.  
皮肤—电解液有腐蚀性, 会刺激皮肤甚至灼伤皮肤。
4. Ingestion—The electrolyte solution causes tissue damage to throat and gastrointestinal track.  
吞食—电解液会导致咽喉组织损伤和胃肠道损伤。

**Environment harm 环境危害:** Not necessary under conditions of normal use. 正常使用条件下没有危害。

**Explosion danger 爆炸危险:** The battery may be explosive at high temperature (above 60°C) or exposing to the fire. 电池在高温条件下 (大于 60°C) 或者置于火中会导致爆炸。

## 3. Composition/Information on Ingredients 原料成分信息

Chemical Name 化学名称	Percent of Content 含量百分比	CAS No. CAS 编号
Lithium cobalt oxide	30-60	12190-79-3
Graphite	10-30	7782-42-5
Phosphate(1-),hexafluoro-,lithium	10-30	21324-40-3
Copper	5-10	7440-50-8



Aluminum foil	1-5	7429-90-5
Nickel	1-5	7440-02-0
PVC (Chloroethylene,	1-5	9002-86-2

#### 4. First Aid Measures 急救措施

**Skin contact:** Not anticipated. If the battery is leaking and the contained material contacts the skin, flush with copious amounts of clear water for at least 15 minutes.

**Eye contact:** Not anticipated. If the battery is leaking and the contained material contacts eyes, flush with copious amounts of clear water for at least 15 minutes. Get medical attention at once.

**Inhalation:** Not anticipated. If the battery is leaking, remove to fresh air. If irritation persists, consult a physician.

**Ingestion:** Not anticipated. If the battery is leaking and the contained material is ingested, rinse mouth and surrounding area with clear water at once. Consult a physician immediately for treatment.

**皮肤接触:** 没有事先预料的, 如果电池漏液接触到皮肤上, 立即用大量的清水冲洗至少 15 分钟。

**眼睛接触:** 没有事先预料的, 如果电池漏液接触到眼睛上, 立即用大量的清水冲洗至少 15 分钟, 并立即就医。

**吸入:** 没有事先预料的电池泄漏, 转移到空气新鲜的地方, 如果刺激性还存在, 请咨询医生。

**吞食:** 没有事先预料的, 如果电池漏液并且吞食了电池原料, 立即用清水冲洗嘴部及周围部位, 并就医治疗。

#### 5. Fire Fighting Measures 消防措施

**Unusual Fire and Explosion Hazards:** Battery may explode or leak potentially hazardous vapors subject to: exposed to excessive heat (above the maximum rated temperature as specified by the manufacturer) or fire, over-charged, short circuit, punctured and crushed.

**Hazardous Combustion Products:** Fire, excessive heat, or over voltage conditions may produce hazardous decomposition products. Damaged batteries can result in rapid heating and the release of flammable vapors.

**Extinguishing Media:** Dry chemical type extinguishers are the most effective means to extinguish a battery fire. A CO<sub>2</sub> extinguisher will also work effectively.

**Fire Fighting Procedures:** Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire. Full protective clothing is necessary. During water application, caution is advised as burning pieces of flammable particles may be ejected from the fire.

**异常着火和爆炸危险:** 电池爆炸或漏液可能是由以下原因导致: 暴露于高温环境 (超过制造商规定的最大额定温度) 或者火中, 电池过充电, 短路, 刺穿和挤压。

**产品烧毁危害:** 着火, 过热或者过压条件可能会导致产品分解。损坏的电池会导致快速升温 and 释放可燃性气体。

**灭火仪器:** 对于电池着火灭火最有效的是干燥的化学型灭火器, 二氧化碳灭火器也可。

**消防程序:** 如果火灾中有电池, 要使用正压呼吸装置, 全防护服是必不可缺的, 在使用水设备时要小心谨慎, 因为燃烧的一些可燃性颗粒会从火中喷射出。

## 6. Accidental Release Measures 偶然的释放措施

The material contained within the battery would only be released under abusive conditions. In the event of battery rupture and leakage, collect all the released materials that are not hot or burning in an appropriate waste disposal container while wearing proper protective clothing and ventilate the area. Placed in approved container and disposed according to the local regulations.

电池内部的原料只会在恶劣条件下释放。万一电池破裂和泄漏, 收集所有不热和燃烧后的残渣置于废料处理箱, 要穿上防护服和在通风的地方进行。放置在被批准的容器并按照规定处理废料。

## 7. Handling and Storage 操作和贮存

### Handling 操作:

1. Batteries are designed to be recharged. However, improperly charging a battery may cause the battery to flame. When charging the battery, use dedicated chargers and follow the specified conditions.  
电池被设计为可充电的, 然而不正确的充电方式可能会导致电池着火。当给电池充电时, 要使用专用的充电器并按照指定的充电条件进行。
2. Never disassemble or modify a battery. 不拆解电池。
3. Do not immerse, throw, and wet a battery in water. 不浸没、投掷和用水弄湿电池。
4. Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid the inhalation of any vapors that may be emitted. 如果电池被无意挤压而导致内部物质释放, 必须带上橡胶手套处理所有的电池成分, 避免吸入释放的任何气体。
5. Short circuit causes heating. In addition, short circuit reduces the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short-circuited battery can cause skin burn. 短路会引起电池过热。此外, 短路会使电池寿命大大减少, 甚至会导致周围材料着火。身体接触短路的电池会导致皮肤灼伤。
6. Avoid reversing the battery polarity, which can cause the battery to be damaged or flame. 避免颠倒电池极性, 可能会引起电池损坏或者燃烧。
7. In the event of skin or eye exposure to the electrolyte, refer to Section 4, First Aid



**Measures.**如果皮肤或者眼睛接触到电解液，参考第四项并立即采取急救措施。

### **Storage 贮存:**

1. Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks. Do not place batteries near heating equipment, nor expose to direct sunlight for long periods. 电池应该和其他材料分开并且贮存在通风且不易燃烧的地方。自动灭火装置应与墙和电池组保持足够的间隙。不要把电池靠近加热装置，或者直接长时间的暴露于阳光直射的区域。
2. Do not store batteries above 35°C or below -20°C. Store batteries in a cool (about 20±5°C) in a long time, dry and ventilated area that is subject to little temperature change. Elevated temperatures can result in reduced battery cycle life. Battery exposure to temperatures in excess of 60°C will result in the battery venting flammable liquid and gases. 不要在35°C以上和-20°C以下的环境贮存电池。电池应该贮存在干燥的、通风良好的阴凉区域（大约20±5°C）。升高温度会导致电池循环寿命减少。电池暴露于60°C以上的温度可能会导致电池泄漏可燃性液体和气体。
3. Keep batteries in original package until use and do not jumble them. 保持电池最原始的包装直到使用时，不要把电池弄混乱。

## **8. Exposure Controls/Personal Protection 暴露控制/自我防护**

**Engineering Controls:** Keep away from heat and open flame.

**Ventilation:** Not necessary under conditions of normal use. In case of abuse, use adequate mechanical ventilation (local exhaust) for the battery that vent gas or fumes.

**Respiratory Protection:** Not necessary under conditions of normal use. If battery is burning, leave the area immediately. During fire fighting fireman should use self-contained breathing, full-face respiratory equipment. Fires may be fought but only from safe fire fighting distance, evacuate all persons from the area of fire immediately.

**Eye Protection:** Not necessary under conditions of normal use. Use safety glasses with side shields if handling a leaking or ruptured battery.

**Body Protection:** Not necessary under conditions of normal use. Use rubber apron and protective working in case of handling a leaking or ruptured battery.

**Protective Gloves:** Not necessary under conditions of normal use. Use chemical resistant rubber gloves if handling a leaking or ruptured battery.

**Others:** Use good chemical hygiene practice. Wash hands thoroughly after cleaning-up a battery spill caused by leaking battery. No eating, drinking, or smoking in battery storage area.

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**工程控制:** 远离高温和明火。

**通风设备:** 正常使用条件下是不必要的。为了防止不合理的滥用, 要使用合适的机械通风设备排出电池产生的气体和黑烟。

**呼吸防护:** 正常使用条件下是不必要的。如果电池着火, 立即远离着火区域。在灭火期间要使用自给自足的全脸防护的呼吸装置。要保持安全的灭火距离并立即疏散着火区域的所有人员。

**眼睛防护:** 正常使用条件下是不必要的。处理泄漏或者破裂的电池时要戴上有边罩的防护眼镜。

**身体防护:** 正常使用条件下是不必要的。处理泄漏或者破裂的电池时要穿上有橡胶围裙或者安全工作服。

**防护手套:** 正常使用条件下是不必要的。处理泄漏或者破裂的电池时要戴上抗化学腐蚀的橡胶手套。

**其他:** 保持良好的化学卫生习惯。清理完泄漏电池的漏液后要彻底地清洗手。在贮存电池的区域不吃东西, 不喝酒, 不吸烟。

## 9. Physical and Chemical Properties 物理和化学特性

(a) Appearance 外观

Blue Solid 蓝色固体

(b) Odor 气味

Monotony 无味

(c) Odor threshold 气味阈值

Not available. 不适用。

(d) pH PH 值

Not available. 不适用。

(e) Melting point/freezing point 熔点/凝固点

Not available. 不适用。

(f) Initial boiling point and boiling range  
初始沸点和沸腾范围

Not available. 不适用。

(g) Flash point 闪点

Not available. 不适用。

(h) Evaporation rate 蒸发速率

Not available. 不适用。

(i) Flammability 易燃性 (固态、气态)

Not available. 不适用。

(j) Upper/lower flammability or explosive limits

Not available. 不适用。

上下易燃极限或爆炸极限

(k) Vapor pressure 蒸汽压力

Not available. 不适用。

(l) Vapor density 蒸汽密度

Not available. 不适用。

(m) Relative density 相对密度

Not available. 不适用。

(n) Solubility(ies) 可溶性

Not available. 不适用。

(o) Partition coefficient: n-octanol/water  
分配系数: n-辛醇/水

Not available. 不适用。

(p) Auto-ignition temperature 自燃温度

Not available. 不适用。

(q) Decomposition temperature 自动点火温度

Not available. 不适用。

(r) Viscosity 分解温度

Not available. 不适用。



## 10. Stability and Reactivity 稳定性和反应活性

**Stability:** Stable

**Conditions to Avoid:** Do not heat, throw into fire, disassemble, short circuit, immerse in water or overcharge, etc.

**Incompatibility:** None during normal operation. Avoid exposure heat, open flame and corrosives.

**Hazardous Polymerization:** Will not occur.

**Hazardous Decomposition Products:** The battery may release irritative gas once the electrolyte leakage.

**稳定性:** 稳定

**避免条件:** 不能加热, 不要置于火中, 不随便拆解, 不短路, 不浸入水中, 不过充等。

**不适用性:** 正常操作条件下没有。避免暴露在高温、明火和腐蚀性物质环境中。

**聚合物危害:** 不会发生。

**拆解产品危害:** 一旦电解液泄漏, 电池会挥发出刺激性气体。

## 11. Toxicological Information 有害物质信息

The battery does not elicit toxicological properties during routine handling and use. If the battery is opened through misuse or damage, discard immediately. Internal components of cell are irritant and sensitization.

**Irritancy:** The electrolytes contained in this battery can irritate eyes with any contact. Prolonged contact with the skin or mucous membranes may cause irritation.

**Sensitization:** No information is available.

**Teratogenicity:** No information is available.

**Carcinogenicity:** No information is available.

**Mutagenicity:** No information is available.

**Reproductive toxicity:** No information is available.

电池在正常的操作和使用中不能有发出有毒物质。如果由于不正确的使用或破坏导致电池裂开, 立即丢掉。电芯内部成分有刺激性甚至诱发过敏。

**刺激性:** 电池内部的电解液会刺激眼睛。皮肤或黏膜长时间接触或产生刺激效应。

**过敏:** 没有可用的信息。

**致畸胎性:** 没有可用的信息。

**致癌性:** 没有可用的信息。

**诱变性:** 没有可用的信息。

**生殖毒性:** 没有可用的信息

## 12. Ecological Information 生态信息

1. When properly used and disposed, the battery does not present environmental

hazard.

正确使用电池时不会造成环境损害。

2. The battery does not contain mercury, cadmium, or lead.

电池不能含有汞、镉、铅。

3. Do not let internal components enter marine environment. Avoid releasing to water ways, wastewater or ground water.

不要让电池内部成分进入水生态。避免排入水路系统、废水和地下水中。

### 13. Disposal Considerations 废弃处理

1. Disposal of the battery should be performed by permitted, professional disposal firms knowledgeable in Federal, State or Local requirements of hazardous waste treatment and hazardous waste transportation. 处理电池要有许可，在联邦、国家或者当地危害物质处理部门和危害物质运输部门要求的处理知识。
2. The battery should be completely discharged prior to disposal and/or the terminals taped or capped to prevent short circuit. When completely discharged it is not considered hazardous. 处理电池之前要完全放电或者把电池末端用胶带粘上防止短路。完全放电的电池被认为是没有危害的。
3. The battery contains recyclable materials. Recycling options available in your local area should be considered when disposing of this product, through licensed waste Carrier.

电池包含可循环利用的材料。在当地回收利用这些处理掉的产品时，要取得废弃物处理的授权。

### 14. Transport Information 运输信息

According to PACKING INSTRUCTION 965 ~ 967 of IATA DGR 63rd Edition for transportation, the special provision 188 of IMDG (inc Amdt. 40-20). The batteries should be securely packed and protected against short-circuits. Examine whether the package of the containers are integrate and tighten closed before transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles. Don't put the goods together with oxidizer and chief food chemicals. The transport vehicle and ship should be cleaned and sterilized before transport. During transport, the vehicle should prevent exposure, rain and high temperature. For stopovers, the vehicle should be away from fire and heat sources. When transported by sea, the assemble place should keep away from bedroom and kitchen, and isolated from the engine room, power and fire source. Under the condition of Road Transportation, the



driver should drive in accordance with regulated route, don't stop over in the residential area and congested area.

根据包装说明的 IATA DGR 第 63 期 965 ~ 967 运输、IMDG 的特殊条款 188 (inc Amdt. 40-20)。电池应牢固地填充,防止短路。检查集装箱的包装是否在运输前整合并拧紧。确定没有一个货物掉落,跌落,和破损,防止货物堆崩溃。不要把货物与氧化剂,食品放在一起。运输车辆和船舶在运输前应清洗和消毒,运输车辆应避免接触雨水和高温。停留时,车辆应远离火和热源。海运时,装配位置应远离卧室和厨房,并从机舱、电源和火源处隔离。公路运输情况下,司机开车应该按照规定路线,不要在居民区和人口稠密区停留。

**(a) UN number UN 编号**

UN3480&UN3481

**(b) UN Proper shipping name UN 适当的运输名称**

LITHIUM ION BATTERIES (including lithium ion polymer batteries) or; LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)

锂离子电池(包括锂离子聚合物电池);或内置在设备中的锂离子电池或与设备包装在一起的锂离子电池(包括锂离子聚合物电池)。

**(c) Packing Instruction (if applicable)包装方式 (如果适用)**

965 II/ IB, 966 II, 967 II

**(d) Transport hazard class(es)运输风险类**

9

**(e) Marine pollutant 海洋污染物(Yes/No)**

No

**(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)**

散装运输

No information available.无可用信息。

**(g) Special precautions 特别预防措施**

No information available.无可用信息。

## 15. Regulatory Information 监管信息

The transport of rechargeable lithium-ion batteries regulated by the united nations as detailed in the "model Regulations on the transport of dangerous Goods Ref. ST/SG/AC.10/1 Rev.21"

Defined by the Seventh Revised Edition of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.7/Section38.3).The Lithium-ion Cells and the battery Packs may or may not be assigned to the UN3480 Class-9 that is restricted for transport.

锂离子电池的运输受联合国的统一监管,详见“关于危险货物运输的新型法规参考“ST/SG/AC.10/1 Rev.21”

联合国《关于危险货物运输的建议书，试验和标准手册》第七修订版第 38.3 节 (ST/SG/AC.10/11/Rev.7/Section38.3) 明确规定锂离子电芯和电池组有可能或可能不被划分到 UN3480 第九类危险品

## 16. Other Information其他信息

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. Shenzhen Tiansu Calibration and Testing Co.,Ltd.,doesn't assume responsibility for any damage or loss because of misuse of batteries.

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，深圳天溯计量检测股份有限公司不承担任何责任。



## STATEMENTS

## 声 明

1. The test report is invalid without the official stamp of Tiansu.  
本报告无检测单位印章无效。
2. This report shall not be copied partly without the written approval of Shenzhen Tiansu Calibration and Testing Co.,Ltd  
除非全部复制, 否则无深圳天溯计量检测股份有限公司书面批准本报告不得部分复制。
3. This report is invalid without the signature of the approver, reviewer, and tester.  
本报告无批准人、审核人及检测人签名无效。
4. The test report is invalid if altered.  
本报告涂改无效。
5. Objections to the test report must be submitted to Tiansu within 15 days.  
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。
6. The test report is valid for the tested samples only.  
本报告仅与送检样品有关。

-- End of report --

-- 报告结束 --

# UN38.3 Test Summary

## UN38.3 试验概要

<b>UN38.3 Report No.</b> UN38.3 报告编号	TCT200414B053				
<b>Applicant's name</b> 委托方名称	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司				
<b>Applicant's Address</b> 委托方地址	Building A, Lanshukeng, Hongwei Village, Xinxu Town, Huiyang District, Huizhou City, Guangdong Province, China 惠州市惠阳区新圩镇红卫村榄树坑（厂房 A）				
<b>Manufacturer's name</b> 制造商名称	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司				
<b>Manufacturer's Address</b> 制造商地址	Building A, Lanshukeng, Hongwei Village, Xinxu Town, Huiyang District, Huizhou City, Guangdong Province, China 惠州市惠阳区新圩镇红卫村榄树坑（厂房 A）				
<b>Manufacturer's Contact Telephone</b> 制造商联系电话	+86-752-3339 150	<b>E-mail</b> 邮箱	289126701@qq.com	<b>Web</b> 网址	----
<b>Name of Sample</b> 样品名称	Lithium-ion Rechargeable Cell 锂离子可充电电芯		<b>Model</b> 型号	JXY 18650 1500mAh	
<b>Trade Mark</b> 商标	----		<b>Shape</b> 形状	Cylindrical 圆柱形	
<b>Watt-hour</b> 瓦时	5.55Wh		<b>Sample Mass</b> 样品重量	39.8g	
<b>Description</b> 描述	Lithium ion Cell 锂离子电芯		<b>Date of Test Report</b> 测试报告签发日期	2020. 04. 24	

### Test Standard 检测标准:

UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of Tests and Criteria" Sixth revised edition Amendment 1 (ST/SG/AC.10/11/Rev.6/Amend.1)

联合国《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 (ST/SG/AC.10/11/Rev.6/Amend.1)

Testing Laboratory 测试实验室:

Shenzhen TCT Testing Technology Co., Ltd. 深圳市通测检测技术有限公司

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## Test item & Conclusion 测试项目和结论:

Test item 项目	Conclusion 结论	Test item 项目	Conclusion 结论
T.1. <input checked="" type="checkbox"/> Altitude simulation 高度模拟	Pass 合格	T.5. <input checked="" type="checkbox"/> External short circuit 外部短路	Pass 合格
T.2. <input checked="" type="checkbox"/> Thermal test 温度试验	Pass 合格	T.6. <input checked="" type="checkbox"/> Impact / <input type="checkbox"/> Crush 撞击/挤压	Pass 合格
T.3. <input checked="" type="checkbox"/> Vibration 振动	Pass 合格	T.7. <input type="checkbox"/> Overcharge 过充电	/
T.4. <input checked="" type="checkbox"/> Shock 冲击	Pass 合格	T.8. <input checked="" type="checkbox"/> Forced discharge 强制放电	Pass 合格
38.3.3 (f)	/	38.3.3 (g)	/
Approved by 批准人	Allen Qin 秦超 Manager 经理	Date of Issue 签发日期	

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# UN38.3 Test Report

## UN38.3 检测报告

<b>Applicant's name</b> 委托方名称	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司
<b>Applicant's Address</b> 委托方地址	Building A, Lanshukeng, Hongwei Village, Xinxu Town, Huiyang District, Huizhou City, Guangdong Province, China 惠州市惠阳区新圩镇红卫村榄树坑（厂房 A）
<b>Name of Sample</b> 样品名称	Lithium-ion Rechargeable Cell 锂离子可充电电芯
<b>Model</b> 型号	JXY 18650 1500mAh
<b>Testing Laboratory</b> 测试实验室	Shenzhen TCT Testing Technology Co., Ltd. 深圳市通测检测技术有限公司 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China 中国广东省深圳市宝安区福永桥头亿宝来工业城 1 栋 1 层 B
<b>Report No.</b> 报告编号	TCT200414B053
<b>Date of Issue</b> 签发日期	2020. 04. 24
<b>Test Conclusion</b> 测试结论: The test results are qualified. 测试结果为合格。	

Tested by 主检人: Cherry Huang 黄娇玲Approved by 批准人: Allen Qin 秦超Inspected by 审核人: Amy Zeng 曾红

Seal of TCT 报告单位（盖章）





## I、Sample Description 样品描述

Name of Sample 样品名称	Lithium-ion Rechargeable Cell 锂离子可充电电芯		Model 型号	JXY 18650 1500mAh	
Manufacturer's name 制造商名称	Huizhou Juxingyuan Industrial Co., Ltd. 惠州市聚鑫源实业有限公司				
Manufacturer's Address 制造商地址	Building A, Lanshukeng, Hongwei Village, Xinxu Town, Huiyang District, Huizhou City, Guangdong Province, China 惠州市惠阳区新圩镇红卫村榄树坑（厂房 A）				
Manufacturer's Contact Telephone 制造商联系电话	+86-752-3339150	E-mail 邮箱	289126701@qq.com	Web 网址	----
Trade Mark 商标	----	Shape 形状	Cylindrical 圆柱形	Size 尺寸 (D×H)	(18.3×65.2)mm
Nominal Voltage 标称电压	3.7V	Rated Capacity 额定容量	1500mAh 5.55Wh	Charge Voltage 充电电压	4.2V
Nominal Charge Current 标称充电电流	750mA	Maximum Charge Current 最大充电电流	1500mA	End of Charge Current 结束充电电流	15mA
Discharge Cut-off Voltage 放电截止电压	2.75V	Nominal Discharge Current 标称放电电流	750mA	Maximum Discharge Current 最大放电电流	1500mA
Cell Model 电池型号	----	Cell Nominal Voltage 电池标称电压	----	Cell Rated Capacity 电池额定容量	----
Cells Number 电池数量	----	Sample Receiving Date 样品接收日期	2020. 04. 10	Testing Date 测试日期	2020. 04. 15 — 2020. 04. 24

## II、Test Standard 检测标准

UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of Tests and Criteria" Sixth revised edition Amendment 1 (ST/SG/AC.10/11/Rev.6/Amend.1)

联合国《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 (ST/SG/AC.10/11/Rev.6/Amend.1)

### III、Test Item 测试项目

- |   |  |
|---|--|
| T.1. <input checked="" type="checkbox"/> Altitude simulation 高度模拟 | T.5. <input checked="" type="checkbox"/> External short circuit 外部短路                   |
| T.2. <input checked="" type="checkbox"/> Thermal test 温度试验        | T.6. <input checked="" type="checkbox"/> Impact / <input type="checkbox"/> Crush 撞击/挤压 |
| T.3. <input checked="" type="checkbox"/> Vibration 振动             | T.7. <input type="checkbox"/> Overcharge 过充电   |
| T.4. <input checked="" type="checkbox"/> Shock 冲击                 | T.8. <input checked="" type="checkbox"/> Forced discharge 强制放电                         |

### IV、Test Method and Requirement 测试方法和要求

#### T.1. Altitude simulation 高度模拟

##### Purpose 目的

This test simulates air transport under low-pressure conditions.

本试验模拟在低压条件下的空运。

##### Test procedure 测试程序

Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature ( $20 \pm 5$  °C).

试验电池和电池组应在压力等于或低于 11.6 千帕和环境温度 ( $20 \pm 5$  °C) 下存放至少 6 小时。

##### Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%，电池和电池组即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。

#### T.2. Thermal test 温度试验

##### Purpose 目的

This test assesses cell and battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes.

本试验评估电池和电池组的密封完善性和内部电连接。试验利用迅速和极端的温度变化进行。

##### Test procedure 测试程序

Test Cells and batteries are to be stored for at least six hours at a test temperature equal to  $72 \pm 2$  °C, followed by storage for at least six hours at a test temperature equal to  $-40 \pm 2$  °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ( $20 \pm 5$  °C). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

试验电池和电池组应先在试验温度等于  $72 \pm 2$  °C 的条件下存放至少 6 小时，接着再在试验温度等于  $-40 \pm 2$  °C 的条件下存放至少 6 小时。两个极端试验温度之间的最大时间间隔为 30 分钟。此程序重复进行，共完成 10 次，接着将所有试验电池和电池组在环境温度 ( $20 \pm 5$  °C) 下存放 24 小时。对于大型电池和电池组，暴露于极端试验温度的时间至少应为 12 小时。

##### Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%，电池和电池组即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。



## T.3. Vibration 振动

### Purpose 目的

This test simulates vibration during transport.

本试验模拟运输过程中的振动。

### Test procedure 测试程序

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.

For large batteries: from 7 Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200 Hz.

电池和电池组紧固于振动机平台，但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形，对数频率扫描从 7 赫兹到 200 赫兹，再回到 7 赫兹，跨度为 15 分钟。这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行 12 次，总共为时 3 小时。其中一个振动方向必须与端面垂直。

作对数式频率扫描，对总质量不足 12 千克的电池和电池组(电池和小型电池组)，和对 12 千克及更大的电池组(大型电池组)应有所不同。

对电池和小型电池组：从 7 赫兹开始，保持 1 gn 的最大加速度，直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 8 gn(频率约为 50 赫兹)。将最大加速度保持在 8 gn 直到频率增加到 200 赫兹。

对大型电池组：从 7 赫兹开始，保持 1 gn 的最大加速度，直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 2 gn(频率约为 25 赫兹)。将最大加速度保持在 2 gn 直到频率增加到 200 赫兹。

### Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

如果试验中和试验后无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在第三个垂直安装方位上的试验后立即测得的开路电压不小于在进行这一试验前电压的 90%，电池和电池组即符合本项要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。

## T.4. Shock 冲击

### Purpose 目的

This test assesses the robustness of cells and batteries against cumulative shocks.

本试验评估电池和电池组对累积冲击效应的耐受程度。

### Test procedure 测试程序

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.

Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 gn and pulse duration of 11 milliseconds.

Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the

battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

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.

试验电池和电池组用坚固支架紧固在试验机上，支架支撑着每个试验电池组的所有安装面。

每个电池须经受最大加速度 150 g<sub>n</sub> 和脉冲持续时间 6 毫秒的半正弦波冲击。不过，大型电池须经受最大加速度 50 g<sub>n</sub> 和脉冲持续时间 11 毫秒的半正弦波冲击。

每个电池须经受的正弦波冲击的最大加速度取决于电池组的质量。小型电池组的脉冲持续时间 6 毫秒，大型电池组的脉冲持续时间 11 毫秒。以下公式用于计算合适的最低限度最大加速度。

每个电池或电池组须在三个互相垂直的电池或电池组安装方位的正极方向经受三次冲击，接着在负极方向经受三次冲击，总共经受 18 次冲击。

The formulas below are provided to calculate the appropriate minimum peak accelerations. 以下公式用于计算合适的最低限度最大加速度。

Battery 电池组	Minimum peak acceleration 最低限度最大加速度	Pulse duration 脉冲持续时间
Small batteries 小型电池组	150 g <sub>n</sub> or result of formula $\text{Acceleration}(g_n) = \sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller	6 ms
Large batteries 大型电池组	50 g <sub>n</sub> or result of formula $\text{Acceleration}(g_n) = \sqrt{\left(\frac{30000}{\text{mass}^*}\right)}$ whichever is smaller	11 ms

\* Mass is expressed in kilograms.

\*质量用千克表示

## Requirement 要求

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%，电池和电池组即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。

## T.5. External short circuit 外部短路

### Purpose 目的

This test simulates an external short circuit.

本试验模拟外部短路。

### Test procedure 测试程序

The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57 ± 4 °C, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at 57 ± 4 °C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.

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.

The short circuit and cooling down phases shall be conducted at least at ambient temperature.

对于待试电池或电池组，应加温一段必要的时间，使从外壳测量的温度达到均匀的稳定温度  $57 \pm 4^\circ\text{C}$ 。这段时间的长短取决于电池或电池组的大小和设计，对于这个持续时间应加以评估和记录。如无法进行这种评估，则小型电池和小型电池组的暴露时间应至少 6 小时，大型电池和大型电池组的暴露时间应至少 12 小时。然后，电池或电池组应在  $57 \pm 4^\circ\text{C}$  条件下经受总外电阻小于 0.1 欧姆的短路条件。这一短路条件应在电池或电池组外壳温度回到  $57 \pm 4^\circ\text{C}$  后继续至少 1 小时，或在大型电池组的情况下外壳温度降幅达试验中所观察到的最高温升幅的二分之一并保持低于该数值。

短路和降温阶段的温度应至少相当于环境温度。

## Requirement 要求

Cells and batteries meet this requirement if their external temperature does not exceed  $170^\circ\text{C}$  and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

如果外壳温度不超过  $170^\circ\text{C}$ ，并且在试验过程中及试验后 6 小时内无解体、无破裂，无起火，电池和电池组即符合本项要求。

## T.6. Impact / Crush 撞击/挤压

### Purpose 目的

These tests simulate mechanical abuse from an impact or crush that may result in an internal short circuit.

本节的试验模拟撞击或挤压等可能造成内部短路的机械性破坏。

### Test procedure – Impact (applicable to cylindrical cells not less than 18.0 mm in diameter)

#### 测试程序 – 撞击（适用于直径不小于 18.0 毫米的圆柱形电池）

The test sample cell or component cell is to be placed on a flat smooth surface. A  $15.8 \text{ mm} \pm 0.1 \text{ mm}$  diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A  $9.1 \text{ kg} \pm 0.1 \text{ kg}$  mass is to be dropped from a height of  $61 \pm 2.5 \text{ cm}$  at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or Channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.

The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the  $15.8 \text{ mm} \pm 0.1 \text{ mm}$  diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

试样电池或元件电池放在平坦光滑的表面上。一根 316 型不锈钢棒横放在试样中心，钢棒直径  $15.8 \text{ mm} \pm 0.1 \text{ mm}$ ，长度至少 6 厘米，或电池最长端的尺寸，取二者之长者。将一块  $9.1 \text{ kg} \pm 0.1 \text{ kg}$  的重锤从  $61 \pm 2.5 \text{ cm}$  厘米高处跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿与水平支撑表面呈  $90^\circ$  度落下。

接受撞击的试样，纵轴应与平坦表面平行并与横放在试样中心的直径  $15.8 \pm 0.1 \text{ mm}$  毫米弯曲表面的纵轴垂直。每一试样只经受一次撞击。

### Test procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter)

#### 测试程序 – 挤压（适用于棱柱形、袋状、硬币/纽扣电池和直径小于 18.0 毫米的圆柱形电池）

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately  $1.5 \text{ cm/s}$  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  $13 \text{ kN} \pm 0.78 \text{ kN}$ ;
- (b) The voltage of the cell drops by at least 100 mV; 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 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

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.

Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed

for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.

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)施加的力量达到 13 千牛顿  $\pm 0.78$  千牛顿；
- (b)电池的电压下降至少 100 毫伏；或
- (c)电池形变达原始厚度的 50%或以上。

一旦达到最大压力、电压下降 100 毫伏或更多，或电池变形至少达原厚度的 50%，即可解除压力。

棱柱形或袋状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。圆柱形电池应从与纵轴垂直的方向施压。

每个试样电池或元件电池只做一次挤压试验。试样应继续观察 6 小时。试验应使用之前未做过其他试验的电池或元件电池进行。

#### Requirement 要求

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.

如果外壳温度不超过 170 °C，并且在试验过程中及试验后 6 小时内无解体、无破裂，无起火，电池和电池组即符合本项要求。

## T.7. Overcharge 过充电

#### Purpose 目的

This test evaluates the ability of a rechargeable battery or a single cell rechargeable battery to withstand an overcharge condition.

本试验评估可再充电电池组或可再充电单一电池电池组承受过度充电状况的能力。

#### Test procedure 测试程序

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

(a) When the manufacturer's recommended charge voltage is not more than 18 V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22 V.

(b) When the manufacturer's recommended charge voltage is more than 18 V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

充电电流必须是制造商建议的最大持续充电电流的两倍。试验的最小电压如下：

(a)制造商建议的充电电压不大于 18 伏时，试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。

(b)制造商建议的充电电压大于 18 伏时，试验的最小电压应是最大充电电压的 1.2 倍。

试验应在环境温度下进行。进行试验的时间应为 24 小时。

#### Requirement 要求

Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

充电电池组在试验过程中和试验后 7 天内无解体、无起火，即符合本项要求。

## T.8. Forced discharge 强制放电

#### Purpose 目的

This test evaluates the ability of a primary or a rechargeable cell to withstand a forced discharge condition.

本试验评估原电池或充电电池承受强制放电状况的能力。

#### Test procedure 测试程序

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.



The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

每个电池应在环境温度下与 12 伏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。

将适当大小和额定值的电阻负荷与试验电池串联，计算得出给定的放电电流。对每个电池进行强制放电，放电时间(小时)应等于其额定容量除以初始试验电流(安培)。

### Requirement 要求

Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

原电池或充电电池如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。

## V、General terms and definitions 一般术语与定义

Table 38.3.1: Mass loss limit

表 38.3.1: 质量损失限值

Mass M of cell or battery 电池或电池组质量 M	Mass loss limit 质量损失限值
$M < 1 \text{ g}$	0.5%
$1 \text{ g} \leq M \leq 75 \text{ g}$	0.2%
$M > 75 \text{ g}$	0.1%

In order to quantify the mass loss, the following procedure is provided:

$$\text{Mass loss (\%)} = (M_1 - M_2)/M_1 \times 100$$

质量损失的量化值，可用以下公式计算：

$$\text{质量损失(\%)} = (M_1 - M_2)/M_1 \times 100$$

Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the values in Table 38.3.1, it shall be considered as "no mass loss".

式中：M1 是试验前的质量，M2 是试验后的质量。如果质量损失不超过表 38.3.1 所列的数值，应视为“无质量损失”。

Leakage means the visible escape of electrolyte or other material from a cell or battery or the loss of material (except battery casing, handling devices or labels) from a cell or battery such that the loss of mass exceeds the values in Table 38.3.1.

渗漏是指可以看到的电解液或者其他物质从电池或电池组中漏出，或电池或电池组中的物质损失（不包括电池外壳、搬运装置、或标签），质量损失超过表 38.3.1 所列的数值。

Venting means the release of excessive internal pressure from a cell or battery in a manner intended by design to preclude rupture or disassembly.

排气是指按设计方式释放电池或电池组内部过高的压力，防止其破裂或解体。

Disassembly means a vent or rupture where solid matter from any part of a cell or battery penetrates a wire mesh screen (annealed aluminium wire with a diameter of 0.25 mm and grid density of 6 to 7 wires per cm) placed 25 cm away from the cell or battery.

解体是指排气或破裂使电池或电池组任何部分的固体物质穿过放在离电池或电池 25 cm 处的丝网筛（直径 0.25 mm 的软铝丝，网格密度每厘米 6 至 7 条铝丝）。

Rupture means the mechanical failure of a cell container or battery case induced by an internal or external cause, resulting in exposure or spillage but not ejection of solid materials.

破裂是指内部或外部原因引起的电池容器或电池组外壳机械损坏，造成内装物暴露或溢出，但无固体喷射。

Fire means that flames are emitted from the test cell or battery.

起火是指试验电池或电池组有火焰冒出。

## VI、Main Test Apparatus 主要测试仪器

Serial No. 设备编号	Name of Equipment 设备名称	Model 型号	Calibration Date /Due Date 校准日期/到期日
TC-B01	Low Altitude Simulation Tester 低压高空模拟试验箱	GX-3020-Z	2020. 04. 15
			2021. 04. 14
TC-B04	Vertical Shock Test Instrument 垂直冲击试验台	SY10-2	2020. 04. 15
			2021. 04. 14
TC-B05	Vibration test instrument 振动试验台	ES-3-150	2020. 04. 15
			2021. 04. 14
TC-B07	Battery Test System 电池测试系统	CTS 20V/10A	2020. 04. 15
			2021. 04. 14
TC-B11	Crush Test Instrument 温控型电池挤压试验机	BE-6045T	2020. 04. 15
			2021. 04. 14
TC-B13	Battery Short Circuit Tester 电池短路试验机	GX-6055-B	2020. 04. 15
			2021. 04. 14
TC-B14	Electronic Balance 电子天平	PTT-A+300	2020. 04. 15
			2021. 04. 14
TC-B15	Data Collector 数据采集器	34970A	2020. 04. 15
			2021. 04. 14
TC-B18	DC POWER 直流源	PSW 80-27	2020. 04. 15
			2021. 04. 14
TC-B21	Battery Impact Tester 电池冲击试验机	BE-5066	2020. 04. 15
			2021. 04. 14
TC-B25	Digital Multimeter 数字万用表	15B	2019. 09. 06
			2020. 09. 05
TC-B30	Programmable high & low temperature test chamber 可编程高低温试验机	GX-3000-150	2019. 09. 06
			2020. 09. 05



## VII、Test Data 测试数据

### T.1. Altitude simulation 高度模拟

Test sample status 测试样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Change ratio 电压比(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
first cycle, fully charged state 首次循环满电状态	1#	39.172	4.18	39.168	4.18	0.01	100.0	Pass 合格
	2#	39.529	4.18	39.529	4.18	0.00	100.0	Pass 合格
	3#	39.754	4.19	39.754	4.18	0.00	99.8	Pass 合格
	4#	39.564	4.18	39.564	4.18	0.00	100.0	Pass 合格
	5#	39.472	4.18	39.467	4.18	0.01	100.0	Pass 合格
25th cycle, fully charged state 25 次循环满电状态	6#	39.536	4.19	39.536	4.19	0.00	100.0	Pass 合格
	7#	39.962	4.18	39.962	4.18	0.00	100.0	Pass 合格
	8#	39.071	4.18	39.071	4.18	0.00	100.0	Pass 合格
	9#	38.761	4.19	38.761	4.18	0.00	99.8	Pass 合格
	10#	39.008	4.18	39.008	4.18	0.00	100.0	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.2 °C.

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 测试后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

### T.2. Thermal test 温度试验

Test sample status 测试样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Change ratio 电压比(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
first cycle, fully charged state 首次循环满电状态	1#	39.168	4.18	39.157	4.14	0.03	99.0	Pass 合格
	2#	39.529	4.18	39.518	4.14	0.03	99.0	Pass 合格
	3#	39.754	4.18	39.738	4.15	0.04	99.3	Pass 合格
	4#	39.564	4.18	39.544	4.14	0.05	99.0	Pass 合格
	5#	39.467	4.18	39.447	4.15	0.05	99.3	Pass 合格
25th cycle, fully charged state 25 次循环满电状态	6#	39.536	4.19	39.525	4.15	0.03	99.0	Pass 合格
	7#	39.962	4.18	39.941	4.14	0.05	99.0	Pass 合格
	8#	39.071	4.18	39.061	4.14	0.03	99.0	Pass 合格
	9#	38.761	4.18	38.742	4.15	0.05	99.3	Pass 合格
	10#	39.008	4.18	38.989	4.14	0.05	99.0	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.3 °C.

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 测试后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

## T.3. Vibration 振动

Test sample status 测试样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Change ratio 电压比(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
first cycle, fully charged state 首次循环满电状态	1#	39.157	4.14	39.157	4.14	0.00	100.0	Pass 合格
	2#	39.518	4.14	39.515	4.14	0.01	100.0	Pass 合格
	3#	39.738	4.15	39.738	4.14	0.00	99.8	Pass 合格
	4#	39.544	4.14	39.544	4.14	0.00	100.0	Pass 合格
	5#	39.447	4.15	39.447	4.15	0.00	100.0	Pass 合格
25th cycle, fully charged state 25 次循环满电状态	6#	39.525	4.15	39.523	4.14	0.01	99.8	Pass 合格
	7#	39.941	4.14	39.941	4.14	0.00	100.0	Pass 合格
	8#	39.061	4.14	39.061	4.14	0.00	100.0	Pass 合格
	9#	38.742	4.15	38.742	4.15	0.00	100.0	Pass 合格
	10#	38.989	4.14	38.989	4.14	0.00	100.0	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.2 °C。

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 测试后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。

## T.4. Shock 冲击

Test sample status 测试样品状态	No. 编号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Change ratio 电压比(%)	Status 结果
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
first cycle, fully charged state 首次循环满电状态	1#	39.157	4.14	39.157	4.14	0.00	100.0	Pass 合格
	2#	39.515	4.14	39.515	4.14	0.00	100.0	Pass 合格
	3#	39.738	4.14	39.738	4.14	0.00	100.0	Pass 合格
	4#	39.544	4.14	39.542	4.14	0.01	100.0	Pass 合格
	5#	39.447	4.15	39.447	4.14	0.00	99.8	Pass 合格
25th cycle, fully charged state 25 次循环满电状态	6#	39.523	4.14	39.523	4.14	0.00	100.0	Pass 合格
	7#	39.941	4.14	39.941	4.14	0.00	100.0	Pass 合格
	8#	39.061	4.14	39.061	4.14	0.00	100.0	Pass 合格
	9#	38.742	4.15	38.742	4.14	0.00	99.8	Pass 合格
	10#	38.989	4.14	38.987	4.14	0.01	100.0	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.7 °C。

After the test, there is no leakage, no venting, no disassembly, no rupture and no fire. And change ratio is not less than 90 %. 测试后, 样品无渗漏、无排气、无解体、无破裂和无起火。电压比不小于 90 %。



## T.5. External short circuit 外部短路

Test sample status 测试样品状态	No. 编号	Maximum external temperature (°C) 表面最高温度(°C)	Status 结果
first cycle, fully charged state 首次循环满电状态	1#	100.3	Pass 合格
	2#	101.0	Pass 合格
	3#	100.3	Pass 合格
	4#	100.4	Pass 合格
	5#	101.6	Pass 合格
25th cycle, fully charged state 25 次循环满电状态	6#	100.4	Pass 合格
	7#	101.2	Pass 合格
	8#	100.1	Pass 合格
	9#	101.2	Pass 合格
	10#	100.1	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.4 °C。

Test sample external 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.

测试样品表面温度不超过 170 °C，测试中与测试后 6 小时内无解体、无破裂、无起火。

## T.6. Impact 撞击

Test sample status 测试样品状态	No. 编号	Maximum external temperature (°C) 表面最高温度(°C)	Status 结果
first cycle, 50% charged state 首次循环 50%充电状态	11#	88.4	Pass 合格
	12#	88.3	Pass 合格
	13#	89.2	Pass 合格
	14#	89.2	Pass 合格
	15#	88.3	Pass 合格
25th cycle, 50% charged state 25 次循环 50%充电状态	16#	88.4	Pass 合格
	17#	89.3	Pass 合格
	18#	89.2	Pass 合格
	19#	88.2	Pass 合格
	20#	89.3	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.2 °C。

Test sample external 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.

测试样品表面温度不超过 170 °C，测试中与测试后 6 小时内无解体、无破裂、无起火。

## T.7. Overcharge 过充电

Not applicable 不适用

## T.8. Forced discharge 强制放电

Test sample status 测试样品状态	No. 编号	Status 结果
first cycle, fully discharged state 首次循环完全放电状态	21#	Pass 合格
	22#	Pass 合格
	23#	Pass 合格
	24#	Pass 合格
	25#	Pass 合格
	26#	Pass 合格
	27#	Pass 合格
	28#	Pass 合格
	29#	Pass 合格
	30#	Pass 合格
25th cycle, fully discharged state 25 次循环完全放电状态	31#	Pass 合格
	32#	Pass 合格
	33#	Pass 合格
	34#	Pass 合格
	35#	Pass 合格
	36#	Pass 合格
	37#	Pass 合格
	38#	Pass 合格
	39#	Pass 合格
	40#	Pass 合格

**Notes 注释:** Ambient temperature 环境温度: 23.3 °C。

There is no disassembly and no fire during the test and within seven days after the test.

样品在测试中和测试后 7 天内无解体、无起火。



## VIII、Conclusion 结论

No. 序号	Name of test items 测试项目名称	Cause number of standard 标准条款号	Test Result 检查结果	Conclusion 结论	Remark 备注
1	Altitude simulation 高空模拟	38.3 Test T.1 38.3 试验 T.1	See Appendix T.1. Altitude simulation 见附表 T.1. 高度模拟	Pass 合格	/
2	Thermal test 温度试验	38.3 Test T.2 38.3 试验 T.2	See Appendix T.2. Thermal test 见附表 T.2.温度试验	Pass 合格	/
3	Vibration 振动	38.3 Test T.3 38.3 试验 T.3	See Appendix T.3. Vibration 见附表 T.3.振动	Pass 合格	/
4	Shock 冲击	38.3 Test T.4 38.3 试验 T.4	See Appendix T.4. Shock 见附表 T.4.冲击	Pass 合格	/
5	External short circuit 外部短路	38.3 Test T.5 38.3 试验 T.5	See Appendix T.5. External short circuit 见附表 T.5.外部短路	Pass 合格	/
6	Impact 撞击	38.3 Test T.6 38.3 试验 T.6	See Appendix T.6. Impact 见附表 T.6.撞击	Pass 合格	/
7	/	/	/	/	/
8	Forced discharge 强制放电	38.3 Test T.8 38.3 试验 T.8	See Appendix T.8. Forced discharge 见附表 T.8.强制放电	Pass 合格	/

### According to the standard:

#### 依据标准:

UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of Tests and Criteria" Sixth revised edition Amendment 1 (ST/SG/AC.10/11/Rev.6/Amend.1).

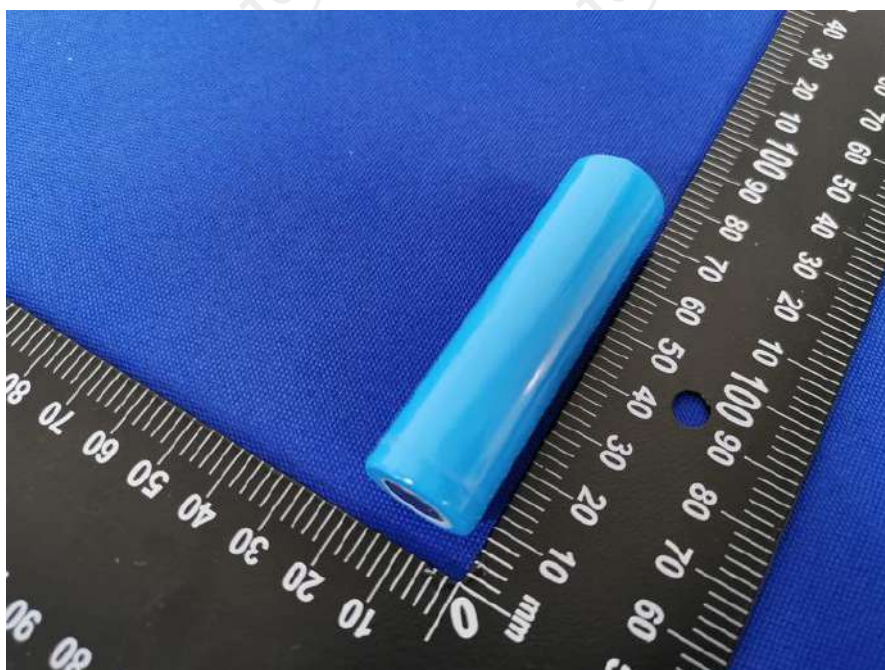
联合国《关于危险货物运输的建议书 试验和标准手册》第六修订版修正 1 (ST/SG/AC.10/11/Rev.6/Amend.1)。

## IX、Picture of the sample 样品图片



Picture 1. Cell view

图片 1. 电池视图



Picture 2. Cell view

图片 2. 电池视图

\*\*\*\*\*End of Report 报告结束\*\*\*\*\*



## Important Notice

### 注意事项

1. The test report is invalid without the official stamp of TCT.  
本报告书无 TCT 盖章无效。
2. Nobody is allowed to photocopy or partly photocopy this test report without written permission of TCT.  
未经 TCT 书面同意，不得复制或部分地复制本报告书。
3. The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.  
本报告书无批准人、审核人、及主检人签名无效。
4. The report is invalid when anything of following happens – illegal transfer, reproduce, embezzlement, imposture, modification or tampering in any media form.  
私自转让、复制、盗用、冒用、涂改、或以任何媒体形式篡改的报告书无效。
5. Objections to the test report must be submitted to TCT within 15 days.  
对报告书若有异议，应于收到报告之日起 15 天内向本公司提出。
6. The test report is valid for the tested samples only.  
本报告仅对本次测试样品有效。
7. The Chinese contents in this report are only for reference.  
本报告中的中文内容仅供参考。