

P/N: 435-0011-03

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Website

<http://www.flir.com>

Customer support

<http://support.flir.com>

Disclaimer

Specifications subject to change without further notice. Camera models and accessories subject to regional market considerations. License procedures may apply. Products described herein may be subject to US Export Regulations. Please refer to exportquestions@flir.com with any questions.



Key features

VividIR Image Processing

- The most advanced image resolution enhancement detects the thermal details you need to find the problems fast.
- FLIR MSX embosses visible edges from the 1440 × 1080 HD camera onto the thermal imagery to create a sharper, easier to understand image.

OneFit Connector

- Adjust the length of the connector up to an additional 4 mm to fit your phone's protective case.

Imaging and optical data

NETD	70 mK
Field of view	55° × 43°
Minimum focus distance	<ul style="list-style-type: none"> • Thermal: 0.15 m (0.49 ft.) • MSX: 0.3 m (0.98 ft.)
Spatial resolution (IFOV)	6.5 mrad/pixel
F-number	1.1
Image frequency	8.7 Hz
Focus	Focus free

Detector data

Focal Plane Array	Uncooled microbolometer
Spectral range	8–14 μm
Detector pitch	12 μm
IR sensor size	160 × 120

Measurement

Object temperature range	–20°C to +400°C (–4°F to +752°F)
Accuracy	±3°C (±5.4°F) or 5%, typical percent of the difference between ambient and scene temperature. Applicable 60 s after start-up when the unit is within +15 °C to +35°C (+59°F to +95°F) and the scene is within +5°C to +120°C (+41°F to +248°F)

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Set-up	
Set-up commands	Local adaptation of units, language, date, and time formats
Languages	Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Simpl. Chinese, Spanish, Swedish, Trad. Chinese, Turkish. Dependent on the language set in the mobile phone.
Lamp	
Lamp	Uses the flashlight of the mobile phone.
Storage of images	
Storage of images	Yes, in the gallery of the mobile phone.
Image file format	<ul style="list-style-type: none"> Standard JPEG 16-bit measurement data included
Video file format	MPEG-4 (MP4)
Digital camera	
Digital camera	1440 × 1080 pixels
Digital camera, focus	Fixed focus 15 cm – infinity
Data communication interfaces	
USB, connector type	Micro USB
USB, standard	USB 2.0
Power system	
Battery type	Rechargeable Li-ion polymer battery
Battery voltage	3.7 V
Battery operating time	1 h
Charging system	Female USB-C (5V / 1A)
Charging time	40 min.
Power management	Automatic shut-down
Environmental data	
Operating temperature range	0°C to +35°C (+32°F to +95°F) Battery charging 0°C to +30°C (+32°F to +86°F)
Storage temperature range	-20°C to +60°C (-4°F to +140°F)
Drop	1.8 m (5.9 ft)
Compliance	
Battery regulations	UL 1642, EN 62133 ED2
EMC	<ul style="list-style-type: none"> EN 61000-6-3 EN 61000-6-1 FCC 47 CFR Part 15 Class B
Magnetic fields	EN 61000-4-8
RoHS	RoHS 2011/65/EC
WEEE	WEEE 2012/19/EC



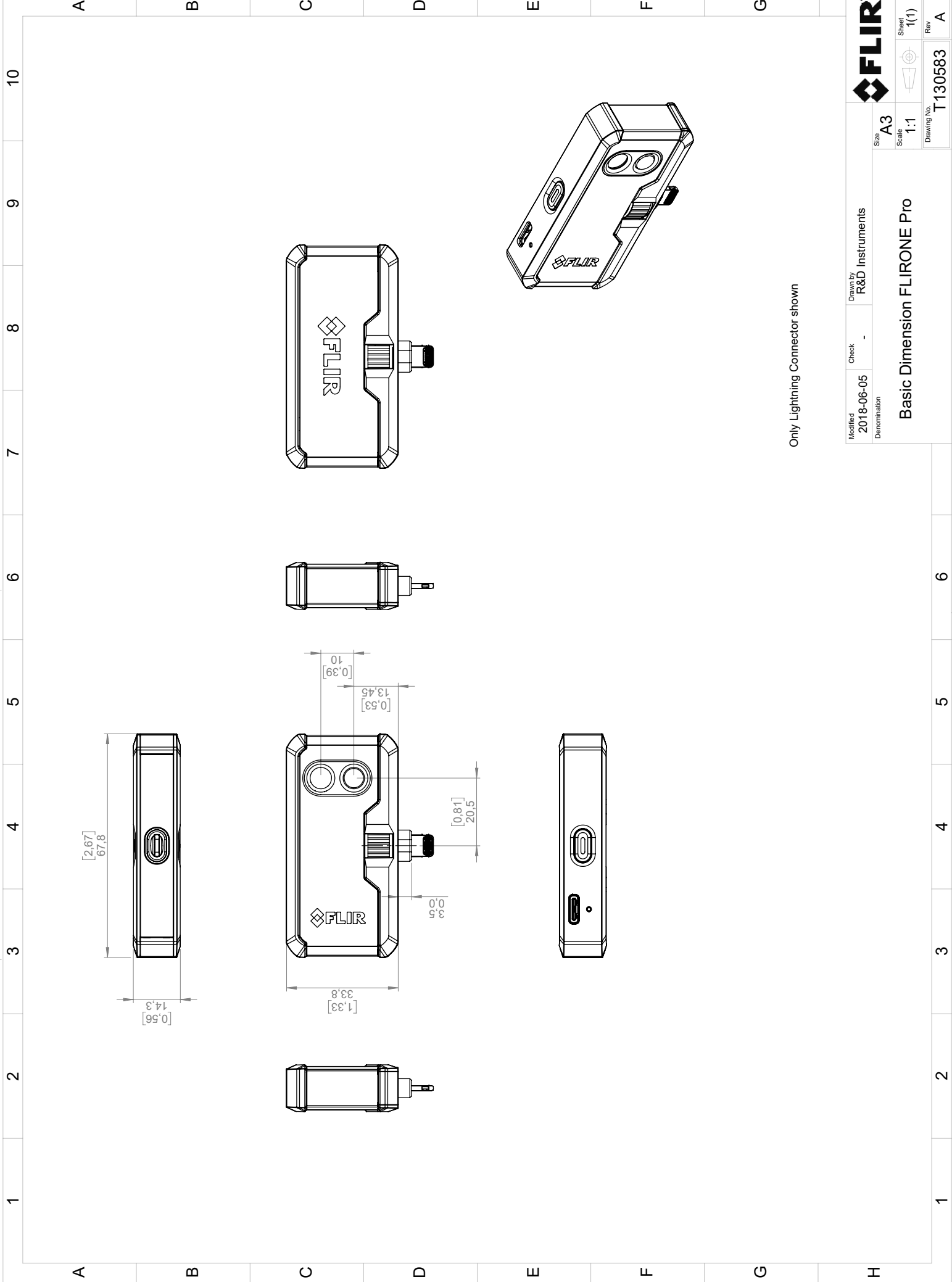
FLIR ONE PRO, Android Micro-USB

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App	
Auto orientation	Yes
Image adjustment (alignment calibration)	Yes
VividIR	Yes
Capture modes	<ul style="list-style-type: none"> • Video • Photo • Time lapse
Image presentation modes	<ul style="list-style-type: none"> • Infrared image • Visual image • MSX • Gallery
Measurement analysis	Adjustable spots and areas of interest; <ul style="list-style-type: none"> • 3 spots • 3 rectangular areas (max.) • 3 circular areas (max.) Resolution 0.1°C / 0.1°F
Emissivity correction	Yes; <ul style="list-style-type: none"> • matte • semi-matte • semi-glossy • glossy
Measurements correction	<ul style="list-style-type: none"> • Emissivity • Reflected apparent temperature +22°C (+72° F)
Color palettes	<ul style="list-style-type: none"> • Iron • Rainbow • Rainbow HC • Gray • Arctic • Lava • Wheel • Hottest • Coldest
Camera software update	Yes
Battery indicator	0-100%
Physical data	
Weight (incl. Battery)	36.5 g (1.3 oz)
Size (L x W x H)	68 x 34 x 14 mm (2.7 x 1.3 x 0.6 in.)
Housing material	<ul style="list-style-type: none"> • PC and ABS, partially covered with TPE • Aluminum
Color	Black and gray
Shipping information	
Packaging, type	Cardboard box
List of contents	<ul style="list-style-type: none"> • Infrared camera • USB cable • Printed documentation • Pouch
Packaging, weight	0.31 kg (0.68 lb.)
Packaging, size	141 x 102 x 67 mm (5.6 x 4.0 x 2.6 in.)
EAN-13	7332558016497
UPC-12	812462024407
Country of origin	Estonia



Only Lightning Connector shown

Modified 2018-06-05	Check -	Drawn by R&D Instruments	FLIR
Denomination Basic Dimension FLIRONE Pro			Sheet 1(1)
Size A3			Rev A
Scale 1:1			Drawing No. T130583



The World's Sixth Sense™

March 22, 2018 Täby, Sweden

AQ320287

CE Declaration of Conformity – EU Declaration of Conformity

Product: FLIR One -series

Name and address of the manufacturer:

FLIR Systems AB

PO Box 7376

SE-187 15 Täby, Sweden

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration: FLIR One -series (FLIR part numbers 435-00xx-xx)

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Directives:

Directive:	2011/65/EU	RoHS
Directive	2014/30/EU	Electromagnetic Compability

Standards:

Emission:	EN 61000-3-2:2014	EMC Limits for harmonic current emissions
	EN 61000-3-3:2013	EMC Limitation of voltage changes
	EN 55032:2012	EMC of multimedia equipment - Emission requirements
Immunity:	EN 55024:2010	Information Tech Equipment Immunity characteristics

FLIR Systems AB

Quality Assurance

Lea Dabiri

Quality Manager



材料安全数据表

Material Safety Data Sheet

货 物 名 称: 锂离子聚合物电池

Name of Goods: Li-ion Polymer Battery

委 托 单 位: 三赢科技（深圳）有限公司

Commissioner: Triple Win Technology(ShenZhen) Co., Ltd.

广东联鼎检测科技有限公司
GUANGDONG UTL CO., LTD.

材料安全数据表

Material Safety Data Sheet

1. Identification of the product and supplier (产品和厂商信息)	
样品名称 Name of goods	锂离子聚合物电池 Li-ion Polymer Battery
样品型号 Type/Mode	602035-02
规格 Rating	3.8V, 520mAh, 1.97Wh
委托单位 Commissioned by	三赢科技（深圳）有限公司 Triple Win Technology(ShenZhen) Co., Ltd.
委托单位地址 Commissioner address	深圳龙华新区东环二路二号富士康科技集团F区F1栋南一门1.5楼 The First Southern Door, 1.5F, F1, F Section, Foxconn Technology Group, No.2, The Second Dong Huan Road, Long Hua New District, Shenzhen, China
生产厂 Manufacturer's name	湖南立方新能源科技有限责任公司 LI-FUN TECHNOLOGY CORPORATION LIMITED
生产厂地址 Manufacturer address	湖南省株洲市天元区创业大道128号天易科技城J地块 Block j, No.128 Tianyi Science&Technology Park, Chuangye Boulevard, Tianyuan District, Zhuzhou City, Hunan Province
鉴定依据 Inspection according to	EEC Directive 93/112/EC 联合国《关于危险品货物运输的建议书》 UN "Recommendations on the TRANSPORT OF DANGEROUS GOODS"
紧急联系电话 Emergency telephone call	+86-755-28128988
接样日期 / Receiving date: 2019-12-29	签发日期 / Date of issue: 2020-01-06

Approved by:

批准:

吴娟

Reviewed by:

审核:

吴顺焜

Tested by:

主检:

杨卓鹏

GUANGDONG UTL CO., LTD.

Liangding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong, China

Tel: +86-769-3893 3228 E-mail: sales@gdutl.com Web: http://www.gdutl.com

2. Composition Information (成分/组成信息)

化学成分 Chemical Composition	化学式 Chemical Formula	重量百分比 Weight(%)	CAS编号 CAS Number
钴酸锂/ Lithium Cobalt Oxide	LiCoO ₂	41.6	12190-79-3
聚偏氟乙烯/ Polyvinylidene Fluoride (PVDF)	C ₂ H ₂ F ₂	0.9	24937-79-9
铝/ Aluminium (Al)	AlH ₃	5.8	7429-90-5
石墨/ Graphite	C ₂₄ X ₁₂	22.1	7782-42-5
丁苯橡胶/ Styrene-Butadiene Rubber (SBR)	C ₁₂ H ₁₄	0.8	61789-96-6
铜/ Copper (Cu)	Cu	10.6	7440-50-8
镍/ Nickel (Ni)	Ni	0.4	7440-02-0
六氟磷酸锂/ Lithium Hexafluorophosphate	LiPF ₆	17.8	21324-40-3

3. Hazards Identification (危险性概述)

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 other risk	该电池瓦时率为1.97Wh，属于锂离子聚合物电池。 Watt hour rate 1.97Wh, which belong to the Li-ion Polymer batteries.

GUANGDONG UTL CO., LTD.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong, China

Tel: +86-769-3893 3228 E-mail: sales@gdutil.com Web: http://www.gdutil.com

4. First aid measures (急救措施)

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:

引用两杯牛奶或水。如果当事人仍然清晰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. Fire-fighting measures (消防措施)

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. Accidental release measures (泄漏应急处理)

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，试验人员应立刻撤离试验区直到烟气消散。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 personnel 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，消耗电池内部的锂金属，并且深埋于土壤中。

Waste Disposal Method

It is recommended to discharge the battery to the end, to use up the metal lithium inside the battery, and to bury the discharged battery in soil.

7. Handling and storage (操作处置和储存)

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与阳光中。

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

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

正常使用条件下不需要。

Ventilation

Not necessary under conditions of normal use.

防护手套

正常使用条件下不需要。

Protective Gloves

Not necessary under conditions of normal use.

其他防护服或设备

正常使用条件下不需要。

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. Physical and chemical properties (物理和化学特性)

外观: 方形

Appearance: Quadrate shape

报告编号: 18PNS110093 02001

Ref. No.: 18PNS110093 02001

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.

燃点: 除单个电芯暴露试验外其他不适用。

Flash Point: Not applicable unless individual components exposed.

可燃性: 除单个电芯暴露试验外其他不适用。

GUANGDONG UTL CO., LTD.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong, China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

Flammability: Not applicable unless individual components exposed.

相对密度: 除单个电芯暴露试验外其他不适用。

Relative density: Not applicable unless individual components exposed.

溶解性 (水溶性): 除单个电芯暴露试验外其他不适用。

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

溶解性 (其他): 除单个电芯暴露试验外其他不适用。

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

10. Stability and reactivity (稳定性和反应活性)

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. Toxicological information (毒理性资料)

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。

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Eye contact: Eye irritant

食入: 吞下中毒。

Ingestion: Poisoning if swallowed

下列情况下健康状况会恶化：万一发生与电池内部材料接触的事故，轻微或严重的刺激，都可能使皮肤出现干燥和灼烧的感觉，并且损坏靶器官（肝脏，肾脏）的神经。

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

12. Ecological information (生态学资料)

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. Disposal consideration (废弃处置)

不要焚烧，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。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. Transport information (运输信息)

运输标签: 锂电池操作标签

Label for conveyance: Lithium Battery Mark

UN编号: UN3480 or UN3481

UN Number: UN3480 or UN3481

包装等级: 不适用

Packing Group: N/A.

EmS编号: F-A, S-I

EmS No: F-A, S-I

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Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

海洋污染物：无

Marine pollutant: No

正确的装运名称：1) 锂离子电池；2) 锂离子电池伴随设备包装在一起；3) 锂离子电池装在设备中（包括锂离子聚合物电池）。

Proper Shipping name: 1) Lithium ion batteries; 2) Lithium ion batteries packed with equipment; 3) Lithium ion batteries contained in equipment. (including Lithium ion polymer batteries)

危险分类：货物应符合国际航空运输协会第61版DGR手册(2020版)第965~967条包装说明第II条(或IB条)的要求，包括通过UN38.3测试。并符合《国际危规》(Amdt.39-18) 2018年第188条的特别规定。

Hazard Classification: The goods shall be complied with the requirements of Section II (or Section IB) of Packing Instructions 965~967 of 61st DGR Manual of IATA (2020 edition), including the passing of the UN38.3 test. And also complies with the Special Provision 188 of IMDG CODE (Amdt.39-18) 2018 Edition.

15. Regulation information (法规信息)

法律信息

Law information

《危险物品规则》

《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)

GUANGDONG UTL CO., LTD.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong, China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

《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. Other information (其他信息)

本文件仅对由委托方三赢科技（深圳）有限公司提供的，并由湖南立方新能源科技有限责任公司生产的电池(602035-02)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，广东联鼎检测科技有限公司(UTL)不承担任何责任。

This file is only effective to the batteries (602035-02) provided by Triple Win Technology(ShenZhen) Co., Ltd. which manufactured by LI-FUN TECHNOLOGY CORPORATION LIMITED. 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. GUANGDONG UTL CO., LTD. (UTL) doesn't assume responsibility for any damage or loss because of misuse of batteries.

Photos

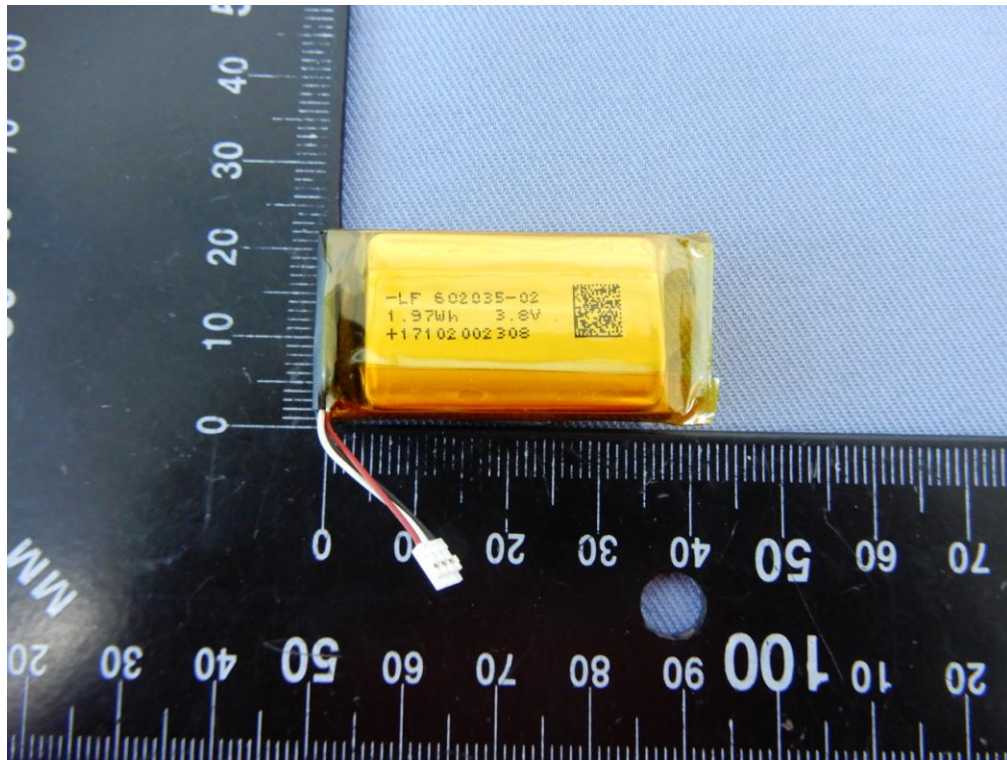


Figure 1 Overall view I of battery (外观图I)

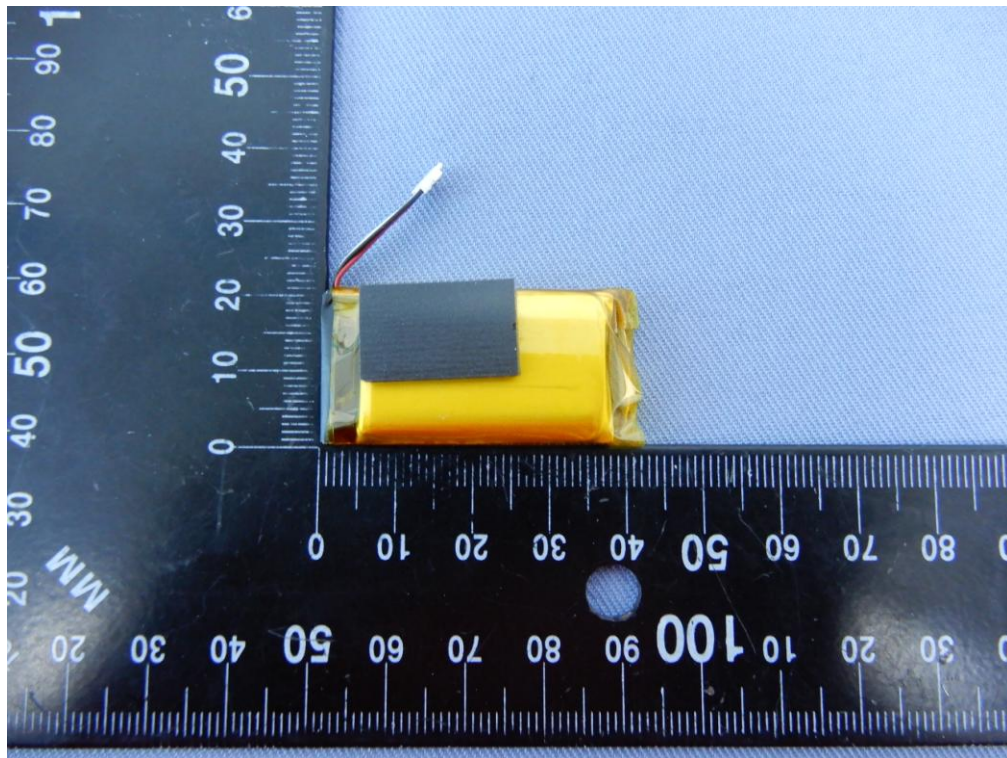


Figure 2 Overall view II of battery (外观图II)



TEST REPORT UN38.3, Sixth Edition Recommendations on transport of dangerous goods, manual of test and criteria, Section 38.3 - Lithium metal and lithium ion Batteries	
Report Reference No.....:	18PNS110093 02001
Date of issue	2018-12-17
Total number of pages	13 pages
Testing Laboratory 检测单位	GUANGDONG UTL CO., LTD. 广东联鼎检测科技有限公司
Address	Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong, China 东莞市南城街道雅园工业区中心路18号联鼎检测大厦
Tested by (name + signature).....:	鄢倩倩 
Reviewed by (name + signature).....:	吴娟 
Approved by (name + signature).....:	赵庆孩 
Applicant's name 申请者:	Triple Win Technology(ShenZhen) Co., Ltd. 三赢科技(深圳)有限公司
Address	The First Southern Door, 1.5F, F1, F Section, Foxconn Technology Group, No.2, The Second Dong Huan Road, Long Hua New District, Shenzhen, China 深圳龙华新区东环二路二号富士康科技集团F区F1栋南一门1.5楼
Manufacturer's name 制造商	LI-FUN TECHNOLOGY CORPORATION LIMITED 湖南立方新能源科技有限责任公司
Address	Block j, No.128 Tianyi Science&Technology Park, Chuangye Boulevard, Tianyuan District, Zhuzhou City, Hunan Province 湖南省株洲市天元区创业大道128号天易科技城J地块
Factory's name 生产厂	LI-FUN TECHNOLOGY CORPORATION LIMITED 湖南立方新能源科技有限责任公司
Address	Block j, No.128 Tianyi Science&Technology Park, Chuangye Boulevard, Tianyuan District, Zhuzhou City, Hunan Province 湖南省株洲市天元区创业大道128号天易科技城J地块
Test specification/测试规范	
Standard	ST/SG/AC.10/11/Rev.6/Section 38.3
Test procedure	N/A
Non-standard test method.....:	N/A
Test item description/样品名称.....:	Li-ion Polymer Battery / 锂离子聚合物电池
Trade Mark/商标	N/A
Model/Type reference/型号	602035-02
Ratings/规格	3.8V, 520mAh, 1.97Wh

List of Attachments (including a total number of pages in each attachment):

附件清单 (含每个附件的总页数):

- Photos documentation (1 page)
- 产品图片 (1页)

Summary of testing:

测试信息概要:

Tests performed (name of test and test clause):

测试项目 (测试命名及条款)

Test(s) 测试项目	Sample Number 样品编号
T.1: Altitude simulation / 高度模拟	c1# - c10#
T.2: Thermal test / 温度试验	
T.3: Vibration / 振动	
T.4: Shock / 冲击	
T.5: External short circuit / 外部短路	
T.6: Crush / 挤压	c11# - c15#
T.7: Overcharge / 过充电	c16# - c23#
T.8: Forced discharge / 强制放电	c24# - c43#

Testing location:

测试地点:

All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 1.
所有测试项目均在第一页中测试单位实验室中进行。

The sample's status is good.

样品状况良好。

The conditions of the batteries of samples No. c1# to c10# and c16# to c19# are at first cycle, in fully charged states.

样品编号c1# -c10#和c16# -c19#为第一次循环充放电周期完全充电状态的电池。

The conditions of the cells of samples No. c11# to c15# are at first cycle at 50% of the design rated capacity.

样品编号c11# -c15#为第一次循环充放电周期充电至标称容量的50%状态的电芯。

The conditions of the batteries of samples No. c20# to c23# are after fifty cycles ending in fully charged states.

样品编号c20# -c23#为五十次循环充放电周期后完全充电状态的电池。

The conditions of the cells of samples No. c24# to c33# are at first cycle, in fully discharged states.

样品编号c24#-c33#为第一次循环充放电周期完全放电状态的电芯。

The conditions of the cells of samples No. c34# to c43# are after fifty cycles ending in fully discharged states.

样品编号c34# -c43#为五十次循环充放电周期后完全放电状态的电芯。

The Li-ion Polymer Batteries submitted by manufacturer are single cell batteries. According to the standard, a single cell Battery is considered a "cell" and shall be tested according to the testing requirements for "cell".

制造商提供的锂离子聚合物电池为单电芯电池, 根据标准规定, 单电芯电池要作为电芯来评估, 按照电芯的测试要求进行测试。

GUANGDONG UTL CO., LTD.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

Test item particulars	
样品信息:	
Cell type	602035-02
电芯型号	
Nominal Voltage of cell	3.8V
电芯额定电压	
Rated Capacity of cell	520mAh
电芯额定容量	
Appearance	Yellow+Black
颜色	黄色+黑色
Number of cell	1pc
电芯数量	
Dimension(mm)	6.2mm(max) × 20.5mm(max) × 38.0mm(max)
尺寸	
Test case verdicts	
测试判定	
Test case does not apply to the test object	N/A
判定不适用于测试对象	
Test item does meet the requirement	P(Pass)
测试符合规定	
Test item does not meet the requirement	F(Fail)
测试不符合规定	
Testing 测试	
Date of receipt of test item	2018-11-29
接样日期	
Date(s) of performance of test	2018-11-29 ~ 2018-12-12
测试周期	
General remarks 备注	
This report shall not be reproduced, except in full, without the written approval of the testing laboratory. 除非全部复制，未经本实验室书面批准不得部分复制。	
The test results presented in this report relate only to the item tested. 本报告的测试结果仅对送检样品负责。	
"(see remark #)" refers to a remark appended to the report. “(见注#)”指报告的备注。	
Throughout this report a point is used as the decimal separator. 本报告中以点代替小数点。	

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Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

General product information:**产品信息:**

The main features of this model are shown as below:

产品主要信息如下:

Model 型号	Nominal capacity 额定容量	Nominal voltage 额定电压	Nominal Charge Current 额定充电电流	Nominal Discharge Current 额定放电电流	Maximum Charge Current 最大充电电流	Maximum Discharge Current 最大放电电流	Maximum Charge Voltage 最大充电电压	Cut-off Voltage 放电截止电压
Battery/ 电池								
602035-02	520mAh	3.8V	104mA	104mA	260mA	520mA	4.35V	3V
Cell/ 电芯								
602035-02	520mAh	3.8V	104mA	104mA	260mA	520mA	4.35V	3V

Test Procedure:

测试程序:

1. Tests T.1 to T.5 shall be conducted in sequence on the same cell. Tests T.6 and T.8 shall be conducted using not otherwise tested cells.

测试T.1-T.5须按顺序依次在同一组电芯上进行。T.6和T.8须用全新的电芯进行测试。

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

质量损失按照如下公式计算:

$$\text{Mass loss (\%)} = \frac{(M1 - M2)}{M1} \times 100$$

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".

M1是测试前的重量，M2是测试后的重量。若质量损失不超过Table 38.3.1中的值即可视为“没有质量损失”。

Table 38.3.1 Mass loss limit

Mass M of cell or battery	Mass loss limit
M < 1 g	0.5%
1 g ≤ M ≤ 75 g	0.2%
M > 75 g	0.1%

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Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.1	Test T.1: Altitude simulation/高度模拟		P
	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±5°C)/将电芯和电池在温度为20±5°C、大气压力不大于11.6kpa的环境中贮存不少于6个小时。		P
	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. /电芯和电池符合要求：无漏液、无排气、无解体、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。此项关于电压方面的要求不适用于完全放电后的电芯和电池。	No leakage, no venting, no disassembly, no rupture and no fire. / 无漏液、无排气、无解体、无破裂以及无着火现象。 The data see table 1. / 测试数据见表1。	P
38.3.4.2	Test T.2: Thermal test/温度试验		P
	Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2°C, followed by storage for at least six hours at a test temperature equal to - 40±2°C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ±5°C). /首先将样品放在72±2°C的环境中放置至少6个小时，然后放在- 40±2°C的环境中放置至少6个小时。温度转换的最大间隔时间为30分钟。如此循环10次，最后将样品放在20±5°C的环境中静置24小时。		P
	For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours. /对于大电芯和大电池，在高温和低温中放置的时间最少12个小时。		N/A

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Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>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.</p> <p>/电芯和电池符合要求：无漏液、无排气、无解体、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。此项关于电压方面的要求不适用于完全放电后的电芯和电池。</p>	<p>No leakage, no venting, no disassembly, no rupture and no fire. / 无漏液、无排气、无解体、无破裂以及无着火现象。</p> <p>The data see table 1. / 测试数据见表1。</p>	P
38.3.4.3	Test T.3: Vibration/振动		P
	<p>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. /样品必须牢固地安装在振动台台面上。振动以正弦波形式，以7Hz增加至200Hz，然后减少回到7Hz为一个循环，一个循环持续15分钟的对数前移传送。对样品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个小时。其中一个振动方向必须是垂直样品的极性平面。</p>		P
	<p>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). /对于质量不大于12kg的样品(电芯和小电池)和质量超过12kg的电池(大电池)，对数扫频不同，</p>		P
	<p>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. /对于电芯和小电池，对数扫频为：从7Hz开始保持1gn的最大加速度直到频率为18Hz，然后将振幅保持在0.8mm (总偏移1.6mm) 并增加频率直到最大加速度达到8gn (频率约为50Hz)，将最大加速度保持在8gn直到频率增加到200Hz。</p>		P

Guangdong UTL Co., Ltd.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	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. /对于大电池, 对数扫频为: 从7Hz开始保持1gn的最大加速度直到频率为18Hz, 然后将振幅保持在0.8mm (总偏移1.6mm) 并增加频率直到最大加速度达到2gn (频率约为25Hz), 将最大加速度保持在2gn直到频率增加到200Hz。		N/A
	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. /电芯和电池符合要求: 无漏液、无排气、无解体、无破裂以及无着火现象; 电芯或电池测试后的开路电压不低于测试前开路电压的90%。此项关于电压方面的要求不适用于完全放电后的电芯和电池。	No leakage, no venting, no disassembly, no rupture and no fire. / 无漏液、无排气、无解体、无破裂以及无着火现象。 The data see table 1. / 测试数据见表1。	P
38.3.4.4	Test T.4: Shock/冲击		P
	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. /以稳固的托架固定住每个样品。		P
	Shock: a half-sine shock of peak acceleration of 150 g _n (or Acceleration(g _n)= $\sqrt{\frac{100850}{mass}}$, which is smaller) and pulse duration of 6 milliseconds, large cells and large batteries shall be subjected to a half-sine or peak acceleration of 50 g _n (or Acceleration(g _n)= $\sqrt{\frac{30000}{mass}}$, which is smaller) and pulse duration of 11 milliseconds/对小电芯或小电池以峰值为150 g _n (或与 $\sqrt{\frac{100850}{mass}}$ 中的较小值) 的半正弦的加速度撞击, 脉冲持续6毫秒, 大电芯和大电池组须经受最大加速度50 g _n (或与 $\sqrt{\frac{30000}{mass}}$ 中的较小值) 和脉冲持续时间11毫秒的半正弦波冲击。		P

Guangdong UTL Co., Ltd.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks. /每个样品必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
	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. /电芯和电池符合要求:无漏液、无排气、无解体、无破裂以及无着火现象;电芯或电池测试后的开路电压不低于测试前开路电压的90%。此项关于电压方面的要求不适用于完全放电后的电芯和电池。	No leakage, no venting, no disassembly, no rupture and no fire. /无漏液、无排气、无解体、无破裂以及无着火现象。 The data see table 1. /测试数据见表1。	P
38.3.4.5	Test T.5: External short circuit/外部短路		P
	The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57±4°C. /保持测试环境温度稳定在57±4°C,以便样品外表温度达到57±4°C。		P
	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±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. /在环境温度57±4°C的条件下,将样品正负极用小于0.1欧姆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
	Cells and batteries meet this requirement if their 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./电芯和电池符合要求:在测试过程中以及之后6个小时内,外表温度不超过170°C,并且无解体、无破裂和无着火现象发生。	No disassembly, no rupture and no fire. /无解体、无破裂以及无着火现象发生。 The data see table 1. /测试数据见表1。	P
38.3.4.6	Test T.6: Impact / Crush/撞击/挤压		P

Guangdong UTL Co., Ltd.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	Test procedure – Impact (applicable to cylindrical cells not less than 18.0 mm in diameter) /撞击(适合于直径大于等于18.0mm的圆柱形电芯)	Pouch cell/袋状电芯	N/A
	The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm±0.1mm 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 kg±0.1 kg mass is to be dropped from a height of 61±2.5 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. /将样品放在一个平坦的光滑平面上。将一直径为15.8 mm± 0.1mm，长度不小于6cm的316不锈钢棒横过样品中部放置后，将一质量为9.1 kg±0.1 kg的重物从61±2.5 cm的高度落向样品。		N/A
	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. /接受撞击的样品，纵轴应与平坦的表面平行并与横放在样品中心的直径15.8 mm±0.1mm弯曲表面的纵轴垂直。每一个样品只接受一次撞击。		N/A
	Test Procedure – Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter). /挤压(适用于棱柱形、袋状、硬币/纽扣电芯和直径小于18.0mm的圆柱形电芯)	Pouch cell/袋状电芯	P
	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. /将样品放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为1.5cm/s。挤压持续进行，直到出现以下三种情况之一		P
	(a) The applied force reaches 13 kN±0.78 kN; /施加力达到13 kN±0.78 kN		P
	(b) The voltage of the cell drops by at least 100 mV; /样品的电压下降至少100mV		N/A

Guangdong UTL Co., Ltd.

Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone, Nancheng District, Dongguan, Guangdong., China

Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	(c) The cell is deformed by 50% or more of its original thickness. /电芯变形达原始厚度的50%以上。		N/A
	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. /棱柱形或袋状电芯应从最宽的一面施压。纽扣/硬币形电芯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
	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. /每个样品都是全新样品，并且只经受一次施压。施压结束后样品应静置观察6小时。		P
	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. /电芯满足要求：在测试过程中以及之后6个小时内，外表温度不超过170°C，并且无解体和无着火现象发生。	No disassembly and no fire. /无解体，无着火现象发生。 The data see table 2. / 测试数据见表2。	P
38.3.4.7	Test T.7: Overcharge/过充电		P
	The charge current shall be twice the manufacturer's recommended maximum continuous charge current. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The minimum voltage of the test shall be as follows: /在室温下，以2倍的制造商宣称的最大持续充电电流对样品充电，测试时间为24小时。测试的最小电压如下：		P
	(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. /如果制造商宣称的充电电压不超过18V，本测试的最小充电电压应是制造商宣称的最大充电电压的两倍或者是22V之中的较小者。	The voltage of the test is 8.7V, and the current is 520mA. / 测试电压为8.7V，电流为520mA.	P
	(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. /如果制造商宣称的充电电压超过18V，本测试的最小充电电压应该是制造商宣称的最大充电电压的1.2倍。		N/A

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Tel:+86-769-3893 3228 Fax:+86-769-3893 3229 E-mail: sales@gdutl.com

UN 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
	There is no disassembly and no fire during the test and within seven days after the test. /在测试中和测试完成后7天内, 样品无解体和无着火现象。	No disassembly and no fire. /无解体, 无着火现象发生。 The data see table 3./测试数据见表3。	N/A
38.3.4.8	Test T.8: Forced discharge/强制放电		P
	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. /在室温下, 将单个电芯连接在12V的直流电源上进行强制放电, 此直流电源供给每个电芯初始电流为制造商宣称的最大放电电流。 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测试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)。		P
	There is no disassembly and no fire during the test and within seven days after the test. /在测试中和测试完成后7天内, 样品无解体和无着火现象发生。	No disassembly and no fire. /无解体和无着火现象发生。 The data see table 4. / 测试数据见表4。	P

Tables

Table 1: T.1~T.5 / 表1. 测试 1~测试 5											
Sample No. 样品编号	Mass prior to test (g)/测试前质量	OCV prior to test (V)/测试前开路电压	Test 1: Altitude simulation/ 测试 1: 高度模拟		Test 2: Thermal test/ 测试 2: 温度试验		Test 3: Vibration/ 测试 3: 振动		Test 4: Shock/ 测试 4: 冲击		Test 5: External Short Circuit/ 测试 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)
c1#	9.260	4.311	0.022	99.977	0.032	99.768	0.022	99.977	0.000	99.953	57.4
c2#	9.261	4.312	0.022	99.954	0.032	99.675	0.000	99.977	0.000	99.953	57.6
c3#	9.290	4.310	0.000	99.977	0.022	99.605	0.022	99.977	0.011	99.977	57.3
c4#	9.277	4.313	0.011	100.000	0.032	99.722	0.011	99.953	0.022	99.977	57.6
c5#	9.253	4.313	0.000	99.954	0.032	99.629	0.011	99.953	0.000	99.953	57.4
c6#	9.235	4.309	0.011	99.954	0.032	99.721	0.022	99.953	0.011	99.953	57.2
c7#	9.248	4.315	0.000	99.977	0.022	99.629	0.000	99.953	0.022	99.953	57.4
c8#	9.238	4.314	0.000	99.954	0.022	99.675	0.000	99.977	0.011	99.977	57.3
c9#	9.216	4.314	0.011	99.954	0.033	99.722	0.000	99.977	0.000	99.977	57.6
c10#	9.242	4.314	0.022	99.954	0.022	99.699	0.022	99.953	0.011	99.953	57.5

Tables

Table 2: Crush/ 表2: 挤压						
Test 6: Crush 测试6: 挤压	Sample No. 样品编号	c11#	c12#	c13#	c14#	c15#
	OCV prior to test/ 测试前开路电压(V)	3.747	3.749	3.757	3.753	3.739
	Temp. (°C) 温度(°C)	22.3	22.3	22.4	22.4	22.3

Table 3 : Overcharge / 表3: 过充电									
Test 7: Overcharge 测试7: 过充电	Sample No. 样品编号	c16#	c17#	c18#	c19#	c20#	c21#	c22#	c23#
	OCV prior to test/ 测试前开路电压(V)	4.312	4.313	4.308	4.309	4.314	4.310	4.311	4.315

Table 4 : Forced discharge / 表4: 强制放电											
Test 8: Forced discharge 测试8: 强制 放电	Sample No. 样品编号	c24#	c25#	c26#	c27#	c28#	c29#	c30#	c31#	c32#	c33#
	OCV prior to test/ 测试前开路电压(V)	3.452	3.461	3.464	3.461	3.458	3.453	3.455	3.461	3.455	3.463
	Sample No. 样品编号	c34#	c35#	c36#	c37#	c38#	c39#	c40#	c41#	c42#	c43#
	OCV prior to test/ 测试前开路电压(V)	3.458	3.456	3.460	3.443	3.456	3.459	3.461	3.456	3.457	3.462

Photos



Figure 1 Top view of battery

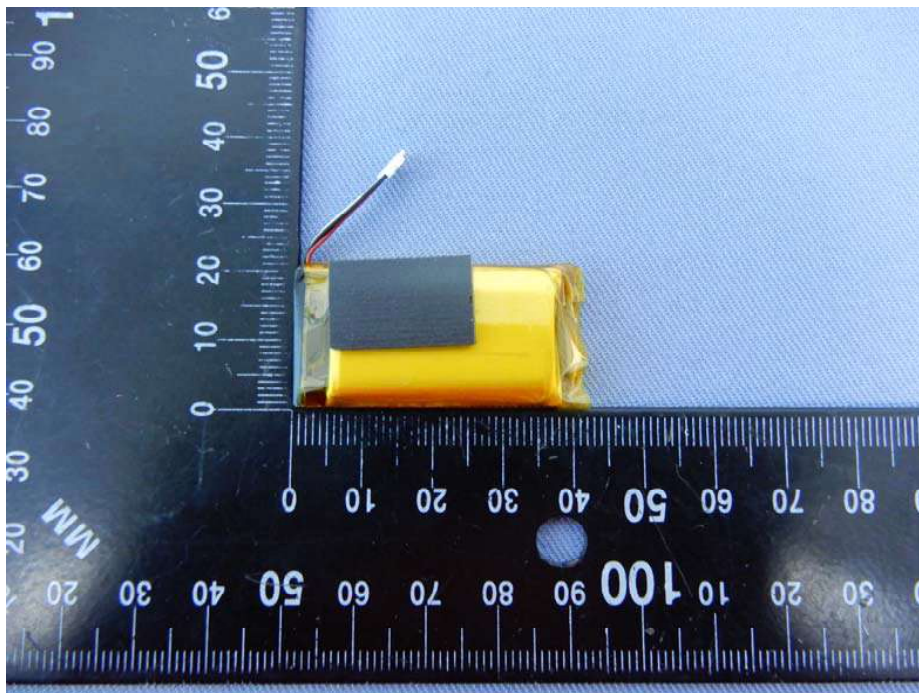


Figure 2 Bottom view of battery