MSDS Report

Applicant: **ATHENA SPA**
Via delle Albere 13, 36045 Alonte (VI) ITALY

Description model: **JUMPSTARTER MINI**

Type Model: **GK-JMPSTR-0002**

Place: ***Alonte (VI) Italy***
Date: ***January 17th, 2020***

ATHENA SPA
QSEE Manager & Legal Representative of Safety& Enviroment
ALBERTO ZAVARISE

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Jumpstarter Mini
TRADE MARK:	GET
MODEL:	GK-JMPSTR-0002
NOMINAL VOLTAGE:	Input: Micro USB 5V⎓1A; Output: USB 5V⎓2.1A; 12V Startup output: Start current ⎓ 150A Peak current ⎓ 300A
RATED CAPACITY:	6000 mAh 22.2Wh
WEIGHT:	About 172 g
DIMENSION:	Max: H: 17mm; W: 67.0mm; L: 132.0mm
MANUFACTURE'S NAME:	Athena S.p.A.
ADDRESS:	Via delle Albere, 13 36045 Alonte VI Italy
CONTACT INFORMATION:	Alberto Zavarise
E-MAIL ADDRESS:	Alberto.Zavarise@athena.eu
VERSION NUMBER:	V1.0
REFERENCED DOCUMENTS:	ISO 11014:2009 Safety data sheet for chemical products

SECTION 2: HAZARDS IDENTIFICATION

PREPARATION HAZARDS AND CLASSIFICATION:	Not dangerous with normal use. Do not dismantle, open or shred Jumpstarter Mini. Exposure to the ingredients contained within or their ingredients products could be harmful.
APPERANCE, COLOR, AND ODOR:	Solid object with no odor, yellow.
PRIMARY ROUTE(S) OF EXPOSURE:	These chemicals are contained in a sealed stainless steel enclosure. Risk of exposure occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by Inhalation, Ingestion, Eye contact and Skin contact
POTENTIAL HEALTH EFFECTS:	**ACUTE (short term):** see Section 8 for exposure controls In the event that this battery has been ruptured, the electrolyte solution contained within the battery would be corrosive and can cause burns. **Inhalation**: Inhalation of materials from a sealed battery is not an expected route of exposure. Vapors or mists from a ruptured battery may cause respiratory irritation. **Ingestion**: Swallowing of materials from a sealed battery is not an expected route of exposure. Swallowing the contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. **Skin**: Contact between the battery and skin will not cause any harm. Skin contact with contents of an open battery can cause severe irritation or burns to the skin. **Eye**: Contact between the battery and the eye will not cause any harm. Eye contact with contents of an open battery can cause severe irritation or burns to the eye. **CHRONIC (long term):** see Section 11 for additional toxicological data
Medical Conditions Aggravated by Exposure	Not applicable
Reported as carcinogen	Not applicable

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Jumpstarter Mini containing lithium-ion polymer is a mixture.

Hazardous Ingredients (Chemical Name)	Concentration or concentration ranges(%)	CAS Number
Cobalt Lithium Dioxide (CoO2Li)	37.6	12190-79-3
Graphite (C)	23.8	7782-42-5
Aluminum (Al)	10.7	7429-90-5
Copper (Cu)	10.6	7440-50-8
Lithium hexafluorophosphate (LiPF6)	0.8	2A1324-40-3
Electrolyte (proprietary)	15.4	96-49-1 616-38-6 623-53-0
PVDF (-[CH2-CF2-]-n)	0.7	24937-79-9
Other	0.3	N/A

Labeling according to EC directives.
No symbol and risk phrase are required.
Note:CAS number is Chemical Abstract Service Registry Number.
N/A=Not apply

SECTION 4 – FIRST-AID MEASURES

Inhalation	If contents of an opened battery are inhaled, remove source of contamination or move victim to fresh air. Obtain medical advice.
Skin contact	If skin contact with contents of an open battery occurs, as quickly as possible remove contaminated clothing, shoes and leather goods. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. If irritation or pain persists, seek medical attention. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Eye contact	If eye contact with contents of an open battery occurs, immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes while holding the eyelids open. Neutral saline solution may be used as soon as it is available. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto face.

	Quickly transport victim to an emergency care facility.
Ingestion	If ingestion of contents of an open battery occurs, never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. Do not induce vomiting. Have victim drink 60 to 240 mL (2-8 oz.) of water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable Properties	In the event that this battery has been ruptured, the electrolyte solution contain within the battery would be flammable. Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.
Suitable extinguishing Media	Use extinguishing media suitable for the materials that are burning.
Unsuitable extinguishing Media	Not available
Explosion Data	**Sensitivity to Mechanical Impact:** This may result in rupture in extreme cases **Sensitivity to Static Discharge**: Not Applicable
Specific Hazards arising from the chemical	Fires involving Jumpstarter Mini can be controlled with water. When water is used, however, hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended to extinguish the fire
Protective Equipment and precautions for firefighters	As for any fire, evacuate the area and fight the fire from a safe distance. Wear a pressure-demand, self-contained breathing apparatus and full protective gear. Fight fire from a protected location or a safe distance. Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.
NFPA	Health: 0 Flammability: 0 Instability: 0

SECTION 6 –

ACCIDENTAL RELEASE MEASURES

Personal Precautions, protective equipment, and emergency procedures	Restrict access to area until completion of clean-up. Do not touch the spilled material. Wear adequate personal protective equipment as indicated in Section 8.
Environmental Precautions	Prevent material from contaminating soil and from entering sewers or waterways.
Methods and materials for Containment	Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.
Methods and materials for cleaning up	Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to directions in Section 13. Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.

SECTION 7 – HANDLING AND STORAGE

Handling	Don't handling Jumpstarter Mini with metalwork. Do not open, dissemble, crush or burn battery. Ensure good ventilation/ exhaustion at the workplace. Prevent formation of dust. Information about protection against explosions and fires: Keep ignition sources away- Do not smoke.
Storage	If the Jumpstarter Mini are subject to storage for such a long term as more than 6 months, it is recommended to recharge the Jumpstarter Mini periodically. Storage Temperature 1 month -20°~+45°C, 3 months -20°~+35°C, 1 year -20°~+20°C,75%RH Max Do not storage Jumpstarter Mini haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects. Keep out of reach of children. Do not expose Jumpstarter Mini to heat or fire. Avoid storage in direct sunlight. Do not store together with oxidizing and acidic materials.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls	Use local exhaust ventilation or other engineering controls to control sources of dust, mist, fumes and vapor. Keep away from heat and open flame. Store in a cool, dry place.
Personal Protective Equipment	**Respiratory Protection**: Not necessary under normal conditions. **Skin and body Protection**: Not necessary under normal conditions, Wear neoprene or nitrile rubber gloves if handling an open or leaking battery. **Hand protection**: Wear neoprene or natural rubber material gloves if handling an open or leaking battery. **Eye Protection**: Not necessary under normal conditions, Wear safety glasses if handling an open or leaking battery.
Other Protective Equipment	Have a safety shower and eye wash fountain readily available in the immediate work area.
Hygiene Measures	Do not eat, drink, or smoke in work area. Maintain good housekeeping.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Form: Solid
	Color: Yellow
	Odour: Monotony
Change in condition:	
pH, with indication of the concentration	Not applicable
Melting point/freezing point	Not available.
Boiling Point, initial boiling point and Boiling range:	Not available.
Flash Point	Not available.
Upper/lower flammability or explosive limits	Not available.
Vapor Pressure:	Not applicable
Vapor Density: (Air = 1)	Not applicable
Density/relative density	Not available.
Solubility in Water:	Insoluble
n-octanol/water partition coefficient	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Odout threshold	Not available.

Evaporation rate	Not available.
Flammability (soil, gas)	Not available.
Viscosity	Not applicable

SECTION 10 – STABILITY AND REACTIVITY

Stability	The product is stable under normal conditions.
Conditions to Avoid (e.g. static discharge, shock or vibration)	Do not subject Jumpstarter Mini to mechanical shock. Vibration encoutered during transportation does not cause leakage, fire or explosion. Do not disassemble, crush, short or install with incorrect polarity. Avoid mechanical or electrical abuse.
Incompatible Materials	Not Available
Hazardous Decomposition Products	This material may release toxic fumes if burned or exposed to fire
Possibility of Hazardous Reaction	Not Available

SECTION 11 – TOXICOLOGICAL INFORMATION

Irritation	Risk of irritation occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin, eyes and respiratory tract may occur.
Sensitization	Not Available
Neurological Effects	Not Available
Teratogenicity	Not Available
Reproductive Toxicity	Not Available
Mutagenicity (Genetic Effects)	Not Available
Toxicologically Synergistic Materials	Not Available

SECTION 12 – ECOLOGICAL INFORMATION

General note:	Water hazard class 1(Self-assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Anticipated behavior of a chemical product in environment/possible environmental impace/ecotoxicity	Not Available

Mobility in soil	Not Available
Persistence and Degradability	Not Available
Bioaccumulation potential	Not Available
Other Adverse Effects	Not Available

SECTION A29 – DISPOSAL CONSIDERATIONS

Product disposal recommendation: Observe local, state and federal laws and regulations. Packaging disposal recommendation: Be aware discarded batteries may cause fire, tape the battery terminals to insulate them. Don't disassembly the battery. Completely discharge containers (no tear drops, no powder rest, scraped carefully). Containers may be recycled or re-used. Observe local, state and federal laws and regulations.

SECTION 14 – TRANSPORT INFORMATION

For the international transport of lithium batteries, they must comply with these regulations: the International Maritime Dangerous Goods (IMDG) Code by International Maritime Organization (IMO), Dangerous Goods Regulations (DGR) by International Air Transport Association (IATA) and Technical Instructions for the Safe Transport of Dangerous Goods by Air by International Civil Aviation Organization (ICAO). These regulations are based on the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.
Lithium batteries which meet the requirements of UN38.3 (UN Manual of Tests and Criteria, Part III, subsection 38.3) could be transported by air and by sea as ordinary goods, otherwise should be transported according to Class 9, Packing Group II hazardous goods.
1. For Lithium battery, UN 3480 or UN 3481. Lithium ion batteries or Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment.
2. The consignment should be fully described by proper shipping name and packed, marked and in proper condition for carriage by air. The consignment is not classified as dangerous under the current edition of the IATA 59th Effective, Dangerous goods regulation and all applicable carrier and government regulations.
3. For transported by air, Lithium-ion Cells/Batteries shipped as "Not Restricted" Cargo must comply with Section II/Section IB of PI965 or Section II of P966-PI967 accordingly; For cells, the Watt-hour rating should not be more than 20Wh; For batteries, the Watt-hour rating should not be more than 100Wh. Watt-hour rating must be marked on the outside of the battery case (marked by manufacturer).
4. Each consignment must be accompanied with a document such as an air waybill with an indication. For those Lithium ion cells/ batteries contained in equipment, the equipment must be equipped with an effective means of preventing accidental activation. The telephone number for additional information for Athena S.p.A. is +39 (0)444 – 727272
5. Quantity per package shall not exceed 10kg in Section IB of PI965. Quantity per package shall not exceed 5kg in Section II of PI966-PI967.
6. For only lithium battery transparent or lithium battery packed with equipment transparent, each package must be capable of withstanding a 1.2m drop test in any orientation without damage of cells or batteries contained therein.
7. Jumpstarter Mini which meet the requirements of GK-JMPSTR-0002 could be

transported by air and by sea, and the batteries manufactured by Athena S.p.A. meet these requirements. (Jumpstarter Mini identified by the manufacturer as being defective for safety reasons or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport.)
8. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit.

SECTION 15 – REGULATORY INFORMATION

OSHA hazard communication standard (29 CFR 1910.1200)
_____Hazardous _____√_____ Non-hazardous

SECTION 16 – OTHER INFORMATION

The information above is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. We makes no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall we be liable for Any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, however arising from using the above information.
The data/information contained herein has been reviewed and approved for general release on the basis that this document contains no export controlled information.

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

Microtest
微测检测

UN38.3测试报告

UN38.3 test report

报告编号 Report No.: MTi180403B006

签发日期 Date of issue: Jan. 17, 2020

样品名称:
Sample Name : 多功能汽车应急启动电源
Multi-function Vehicle Emergency Starting Power

型号:
Model :

委托方:
Client :

委托方地址:
Address :

深圳市微测检测有限公司
Shenzhen Microtest Co., Ltd.

电话(Tel):(86-755)88850135 传真(Fax): (86-755) 88850136 网址(Web): http://www.mtitest.com 邮箱(E-mail): mti@51mti.com
地址(Add): No.102A& 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong,.China.

ST/SG/AC.10/11/Rev.6

AMENDMENTS TO THE SIXTH REVISED EDITION OF THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS, MANUAL OF TEST AND CRITERIA

联合国《关于危险货物运输的建议书，试验和标准手册》

（第六次修订）

(Section 38.3: Lithium batteries)

（38.3章节：锂电池）

Sample Name.....: 样品名称	Multi-function Vehicle Emergency Starting Power 多功能汽车应急启动电源
Trade Mark.....: 商标	N/A
Sample Model.....: 样品型号	
Manufacturer.....: 制造商	
Address.....: 制造商地址	
Testing Laboratory.....: 测试实验室	Shenzhen Microtest Co., Ltd. 深圳市微测检测有限公司 No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China 中国广东省深圳市宝安区西乡街道办兴业路蘅芳工业城厂房东座102A、302A
Received Date.....: 接收日期	2019-12-20
Tested Date.....: 测试日期	2019-12-20~2020-01-02

Test conclusion: 试验结论

The Multi-function Vehicle Emergency Starting Power submitted by is tested according to Section 38.3 of the Sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.6 Section 38.3).

由 送检的多功能汽车应急启动电源，依据联合国《关于危险品货物运输的建议书》第六修订版第38.3节进行检测。

Test result: Pass

试验结果：通过

Tested by (signature):	Checked by (signature):	Approved by (signature):
测试（签名）：袁雪芳	审核（签名）：覃开基	批准（签名）：薛晓林

Ⅰ、Sample Information 样品信息

Sample Model 样品型号		Battery Capacity 电池容量	6000mAh/ 22.2Wh
Nominal Voltage 标称电压	Input: Micro USB 5V⎓1A Output: USB 5V⎓2.1A 12V Startup output: Start current ⎓150A Peak current ⎓300A		
Standard Charge Current 标准充电电流	500mA	Maximum Charge Current 最大充电电流	1000mA
Standard Discharge Current 标准放电电流	2100mA	Maximum Discharge Current 最大放电电流	3000mA
Limited Charge Voltage 充电限制电压	Micro USB:5.05V 5V	Cut-off Voltage(Cell) 放电截止电压(电芯)	3.0V
Cell Number 内含电芯数量	3pcs	Cell Model 电芯型号	ST253595SH35 3.7V

Ⅱ、Conclusion 总结

Standard **标准**	**Item** **项目**	**Sample number** **样品号**	**Verdict** **结论**
ST/SG/AC.10/11/Rev.6 Section 38.3 (UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) 联合国 《关于危险品货物运输的建议书》 第六修订版第38.3节	Altitude simulation 高度模拟	B1-B4, B9-B12	PASS 合格
	Thermal test 温度试验		PASS 合格
	Vibration 振动		PASS 合格
	Shock 机械冲击		PASS 合格
	External short circuit 外部短路		PASS 合格
	~~Impact~~/ Crush ~~撞击~~/挤压	C21-C25	PASS 合格
	Overcharge 过度充电	B5-B8, B13-B16	PASS 合格
	Forced discharge 强制放电	C1-C10, C11-C20	PASS 合格

Possible test case Verdicts: 报告中可能用到的结果标识：	
Test case does not apply to the test object.....: 测试项目不适用于该产品:	N/A 不适用
Test item does meet the requirement.....: 测试项目符合标准的要求	P(ass) 合格
Test item does not meet the requirement.....: 测试项目不符合标准的要求	F(ail) 不合格

III、Main Test Equipment 主要测试设备

NO. 编号	Instrument Name 仪器名称
MTi-B001	低气压试验箱 Low Pressure Chamber
MTi-B002	高低温试验箱 High-Low Temperature Chamber
MTi-B006	液压冲击试验台 Hydraulic Shock Tester
MTi-B007	电磁动态振动测试系统 Electro-dynamic Vibration Test System
MTi-B010	跌落试验机 Drop Tester
MTi-B013	烤箱 Oven
MTi-B021	电子天平 Electronic Balance
MTi-B024	电池充放电测试系统 10V/10A Battery Testing System
MTi-B025	电池充放电测试系统 10V/10A Battery Testing System
MTi-B029	温度记录仪 Temperature Recorder
MTi-B031	直流稳压电源 DC Source
MTi-B032	直流稳压电源 DC Source
MTi-B033	直流电子负载 DC Electronic load
MTi-B044	温度记录仪 Temperature Recorder
MTi-B049	万用表 Multimeter
MTi-B051	移动电源测试系统 Power Bank Testing System
MTi-B052	挤压试验机 Crush Tester
MTi-B053	撞击试验机 Impact Tester

Ⅳ、Test Method and Data 测试方法和数据

Tests T.1 to T.5 shall be conducted in sequence on the same battery. Tests T.6 andT.8 shall be conducted using not otherwise tested batteries. Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

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 than90% 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.

必须用相同的电池按照顺序进行试验1到试验5。试验6和试验8要用没进行过其他试验的电池。为了测试循环后的电池，试验7可用试验1到试验5后没损坏的电池。

要求电池和电池组无渗漏、无排气、无解体、无破裂和无起火并且每个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%。有关电压的要求不适用于完全放电状态的电池和电池组。

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

$$mass\ loss = (M_1 - M_2)/M_1 \times 100\%$$

Where M_1 is the mass before the test and M_2 is the mass after the test, When mass loss does not exceed the values in Table blow, it shall be considered as" no mass loss".

质量损失依照下式计算：

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

式中M1是试验前的质量，M2是试验后的质量。如质量损失不超过下表所列数值，即视为"无质量损失"。

Mass M of cell or battery 电池或电池组质量	**Mass lost limite** 质量损失限值
M＜1g	0.5%
1g≤M≤75g	0.2%
M＞75g	0.1%

Test T.1: Altitude simulation 高度模拟

(1) **Test procedure 试验过程**

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

试验的电芯或电池应在11.6kPa或更少的气压下下存放至少6小时，温度控制在(20±5)°C。

(2) **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.

电芯或电池应满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放电状态的电池和电芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage after test/ Voltage pre- test 试验后电压/试验前电压 (%)	Verdict 结论
	Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
B1	589.24	5.15	589.24	5.15	0.000	100.00	PASS/合格
B2	601.60	5.22	601.60	5.22	0.000	100.00	PASS/合格
B3	593.90	5.16	593.90	5.16	0.000	100.00	PASS/合格
B4	596.21	5.16	596.20	5.16	0.002	100.00	PASS/合格
B9	595.84	5.15	595.84	5.15	0.000	100.00	PASS/合格
B10	594.62	5.17	594.61	5.17	0.002	100.00	PASS/合格
B11	596.21	5.20	596.20	5.20	0.002	100.00	PASS/合格
B12	589.75	5.16	589.74	5.16	0.002	100.00	PASS/合格

#：No leakage, No venting, No disassembly No rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

No.B1 to B4 batteries are end in fully charged state after first cycle.

编号B1-B4的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B9 to B12 batteries are end in fully charged state after 50 cycles.

编号B9-B12的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.2: Thermal test 温度试验

(1) **Test procedure 试验过程**

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 until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5)°C. For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

试验电池和电池组在试验温度等于(72±2)℃下存放至少6小时，接着在试验温度等于(-40±2)℃下存放至少6小时。两个极端温度之间的最大时间间隔为30分钟。这一过程须重复10次，接着将所有电池在环境温度(20±5)℃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。

(2) **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.

电芯或电池满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放完电状态的电池和电芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage after test/ Voltage pre- test 试验后电压/试验前电压 (%)	Verdict 结论
	Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
B1	589.24	5.15	589.22	5.14	0.003	99.81	PASS/合格
B2	601.60	5.22	601.58	5.16	0.003	98.85	PASS/合格
B3	593.90	5.16	593.87	5.13	0.005	99.42	PASS/合格
B4	596.20	5.16	596.17	5.13	0.005	99.42	PASS/合格
B9	595.84	5.15	595.82	5.14	0.003	99.81	PASS/合格
B10	594.61	5.17	594.60	5.13	0.002	99.23	PASS/合格
B11	596.20	5.20	596.18	5.17	0.003	99.42	PASS/合格
B12	589.74	5.16	589.72	5.13	0.003	99.42	PASS/合格

#：No leakage, No venting, No disassembly No rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

No.B1 to B4 batteries are end in fully charged state after first cycle.

编号B1-B4的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B9 to B12 batteries are end in fully charged state after 50 cycles.

编号B9-B12的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.3: Vibration 振动

(1) **Test procedure 试验过程**

1 Cells and batteries are firmly secured to the platform of the vibration machine /电芯和电池牢固地安装在振动台的台面上。

2 The vibration :a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes/振动以正弦波形式，以7Hz增加至200Hz，然后在减少回到7Hz为一个循环，一个循环持续15分钟的对数前移传送。

3 the logarithmic frequency sweep is as follows: from 7Hz a peak acceleration of 1gn is maintained until 18 Hz is reached, The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of $8g_n$ occurs (approximately 50Hz), A peak acceleration of 8 g_n is then maintained until the frequency is increased to 200Hz/对数扫频为:从7赫兹开始保持1gn的最大加速度直到频率为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$8g_n$（频率约为50赫兹），将最大加速度保持在$8g_n$直到频率增加到200赫兹。

4 This cycle repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting position of the cell /以振动的其中一个方向必须是垂直样品极性，对每个电芯从三个互相垂直的方向上循环12次，共3个小时。

(2) **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.

电芯或电池满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％, 此要求不适用于完全放完电状态的电池和电芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage after test/ Voltage pre- test 试验后电压/试验前电压 (%)	Verdict 结论
	Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
B1	589.22	5.14	589.22	5.14	0.000	100.00	PASS/合格
B2	601.58	5.16	601.57	5.16	0.002	100.00	PASS/合格
B3	593.87	5.13	593.87	5.13	0.000	100.00	PASS/合格
B4	596.17	5.13	596.16	5.13	0.002	100.00	PASS/合格
B9	595.82	5.14	595.82	5.14	0.000	100.00	PASS/合格
B10	594.60	5.13	594.58	5.13	0.003	100.00	PASS/合格
B11	596.18	5.17	596.18	5.17	0.000	100.00	PASS/合格
B12	589.72	5.13	589.72	5.13	0.000	100.00	PASS/合格

#：No leakage, No venting, No disassembly No rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

No.B1 to B4 batteries are end in fully charged state after first cycle.

编号B1-B4的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B9 to B12 batteries are end in fully charged state after 50 cycles.

编号B9-B12的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.4: Shock 机械冲击

(1) Test procedure 试验过程

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 or battery shall be subjected to a halfsine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks. However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds. Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

以稳固的支架固定住每个电芯和电池样品的全部试验表面。对每个电芯或电池以峰值为150gn的半正弦的加速度冲击，脉冲持续6毫秒，大型电池和大型电池组须经受最大加速度50gn和脉冲持续时间11毫秒的半正弦波冲击。每个电池或电池组须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受18次冲击。

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 gn or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ Whichever is smaller	6 ms
Large batteries	50 gn or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass^*}\right)}$ Whichever is smaller	11 ms

* Mass is expressed in kilograms.

(2) 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.

电芯或电池应满足以下要求：无漏液、无排气、无分解、无破裂以及无着火现象的发生。样品试验后开路电压应不低于试验前开路电压的90％，此要求不适用于完全放完电的电池和电芯。

Data 数据如下表：

No. 编号	Pre-test测试前		After test测试后		Mass loss 质量损失 (%)	Voltage after test/ Voltage pre- test 试验后电压/试验前电压 (%)	Verdict 结论
	Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
B1	589.22	5.14	589.22	5.14	0.000	100.00	PASS/合格
B2	601.57	5.16	601.57	5.16	0.000	100.00	PASS/合格
B3	593.87	5.13	593.87	5.13	0.000	100.00	PASS/合格
B4	596.16	5.13	596.16	5.13	0.000	100.00	PASS/合格
B9	595.82	5.14	595.82	5.14	0.000	100.00	PASS/合格
B10	594.58	5.13	594.58	5.13	0.000	100.00	PASS/合格
B11	596.18	5.17	596.18	5.17	0.000	100.00	PASS/合格
B12	589.72	5.13	589.72	5.13	0.000	100.00	PASS/合格

#：No leakage, No venting, No disassembly No rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

No.B1 to B4 batteries are end in fully charged state after first cycle.

编号B1-B4的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B9 to B12 batteries are end in fully charged state after 50 cycles.

编号B9-B12的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.5: External short circuit 外部短路

(1) **Test procedure 试验过程**

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57± 4°C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 57± 4°C. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57± 4°C.

试验电芯和电池在57±4°C的环境温度下，经受外部电阻小于0.1欧姆的短路试验，短路时间持续到至少电芯或电池表面温度回复到57±4°C后1小时才结束。

(2) **Requirement 要求**

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.

电芯或电池应满足以下要求：在试验过程中以及试验后6个小时内不起火、不解体、无破裂、表面温度不超过170°C。

Data 数据如下表：

No. 编号	Peak temperature(°C) 表面最高温度	Verdict 结论
B1	55.8	PASS/合格
B2	55.8	PASS/合格
B3	56.0	PASS/合格
B4	55.9	PASS/合格
B9	55.7	PASS/合格
B10	55.9	PASS/合格
B11	55.8	PASS/合格
B12	55.7	PASS/合格

#：No leakage, No venting, No disassembly No rupture and no fire

#：无漏液、无排气、无分解、无破裂以及无着火现象

No.B1 to B4 batteries are end in fully charged state after first cycle.

编号B1-B4的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B9 to B12 batteries are end in fully charged state after 50 cycles.

编号B9-B12的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.6: Impact /Crush (applicable to cylindrical cells not less than 18.0mm in diameter) / Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0mm in diameter) 撞击(适用于直径不小于18.0mm的圆柱形电池)/挤压(适用于棱形、袋状、硬币/纽扣电芯和直径小于18.0mm的圆柱形电芯)

(1) **Test procedure 试验过程– Impact 撞击**

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 9.1kg ± 0.1kg mass is to be dropped from a height of 61 ± 2.5cm 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 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.

将试验电池或元件电池放在平坦光滑平面上，将一根直径为15.8 mm ± 0.1mm的长度取6cm或比电池更长的尺寸中的最长那个的不锈钢棒横放在样品中心，将一质量为9.1kg ± 0.1kg的重锤从61 ± 2.5cm的高度跌落到钢棒与试验样品交叉点上。重锤跌落由一个没有摩擦的、对重锤阻力最小的垂直轨道或管道加以控制用以引导落锤沿水平支撑表面呈90度落下。待试电池纵轴与平面平行，与横放在试样中心的直径15.8 mm ± 0.1mm弯曲表面的纵轴垂直。每个样品只经受一次撞击。

(2) **Test procedure 试验过程– Crush 挤压**

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5cm/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 kN ± 0.78 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.

将电芯或电芯组件放在两个平面之间进行挤压。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：

(a) 施加的力量达到13 kN ± 0.78kN；

(b) 电芯的电压下降至少100mV；或

(c) 电芯变形达原始厚度的50%或以上。

棱形或袋状电芯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，圆柱形电芯应从与纵轴垂直的方向施压。每块电芯或组成电芯只进行一次挤压测试，试验样品应持续观察6h。本试验应用从未进行过其它试验的电芯或电芯组件。

(3) **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.

电芯与电芯组件应满足以下要求：试验过程中及试验结束后6个小时之内不起火、不解体、表面温度不超过170°C。

Data 数据如下表：

No. 编号	Peak temperature(°C) 表面最高温度	Verdict 结论
C21	24.3	PASS/合格
C22	24.5	PASS/合格
C23	24.5	PASS/合格
C24	24.6	PASS/合格
C25	24.4	PASS/合格

No.C21 to C25 cells are end in fully discharged state after first cycle at 50%.

编号C21-C25的状态为在第一个交替充电放电周期完全放电50%状态的电芯。

Test T.7: Overcharge 过度充电

(1) **Test procedure** 试验过程

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 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.

(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.

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

以2倍制造商推荐的最大持续充电电流对样品充电，本测试最小充电电压如下：

(a) 如果制造商推荐的充电电压不超过18V，本测试的最小充电电压应取两倍的制造商规定的最大充电电压或者是22V中的较小者

(b) 如果制造商推荐的充电电压超过18V，本测试的最小充电电压应该为1.2倍的制造商规定的最大充电电压

在环境温度下，试验持续24小时。

(2) **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.

可充电电池应满足以下要求：试验样品在试验中和试验后7天内不解体、不起火。

Data 数据如下表:

No. 编号	Verdict 结论
B5	PASS/合格
B6	PASS/合格
B7	PASS/合格
B8	PASS/合格
B13	PASS/合格
B14	PASS/合格
B15	PASS/合格
B16	PASS/合格

No.B11 to B14 batteries are end in fully charged state after first cycle.

编号B11-B14的状态为在第一个交替充电放电周期完全充电状态的电池。

No.B15 to B18 batteries are end in fully charged state after 50 cycles.

编号B15-B18的状态为在五十个交替充电放电周期结束后完全充电状态的电池。

Test T.8: Forced discharge 强制放电

(1) **Test procedure 试验过程**

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. 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).

在环境温度下，将电芯连接在12V的直流电源上进行强制放电，此直流电源提供给电芯的初始电流为制造商规定的最大放电电流。对于指定的放电电流则需要和测试电芯串联一个匹配的电阻负载，每一个电芯的强制放电时间等于额定容量除以试验初始的放电电流。

(2) **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.

一次或可充电电芯应满足以下要求：试验样品在试验后7天内不解体、不起火。

Data 数据如下表：

No.编号	Verdict 结论
C1	PASS/合格
C2	PASS/合格
C3	PASS/合格
C4	PASS/合格
C5	PASS/合格
C6	PASS/合格
C7	PASS/合格
C8	PASS/合格
C9	PASS/合格
C10	PASS/合格
C11	PASS/合格
C12	PASS/合格
C13	PASS/合格
C14	PASS/合格
C15	PASS/合格
C16	PASS/合格
C17	PASS/合格
C18	PASS/合格
C19	PASS/合格
C20	PASS/合格

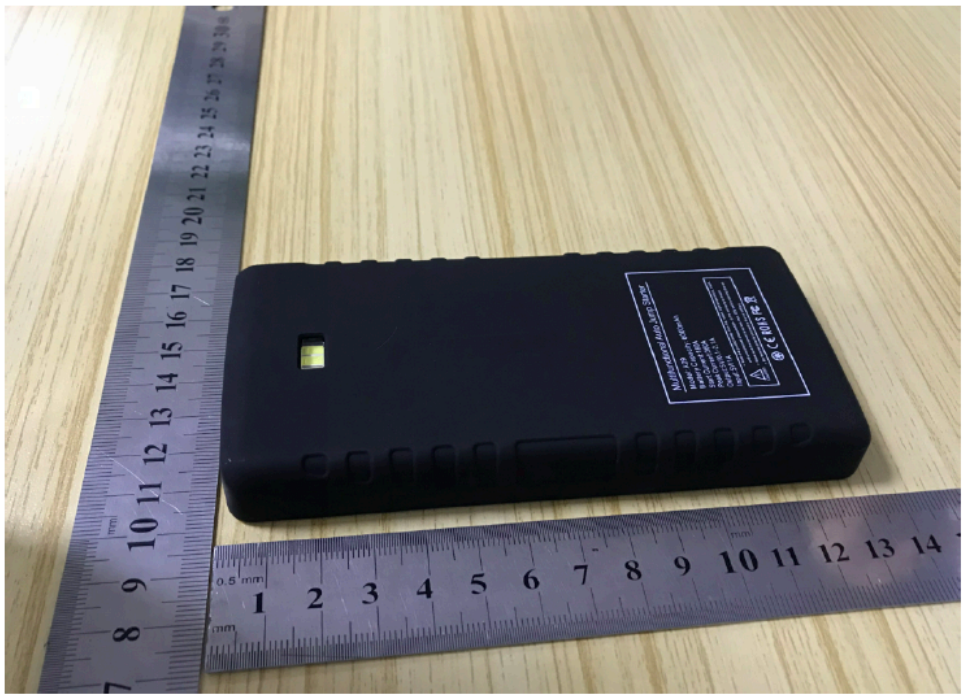
No.C1 to C10 cells are end in fully discharged state after first cycle.

编号C1-C10的状态为在第一个交替充电放电周期完全放电状态的电芯。

No.C11 to C20 cells are end in fully discharged state after 50 cycles.

编号C11-C20的状态为在五十个交替充电放电周期结束后完全放电状态的电芯。

Photos of The Sample 样品图片

Photo 1	
Photo 2	

Important Notice
注 意 事 项

1. The test report is invalid without the official stamp of the lab.
   本报告无检测单位“检验专用章”无效。
2. The test report is invalid without the signature of ratifier, reviewer.
   本报告无批准人、审核人签名无效。
3. Nobody is allowed to photocopy or partly photocopy this report without written permission of the lab.
   未经本实验室书面同意，不得部分地复制本报告。
4. The test report is invalid if illegal transfer,altered or tampering in any media form.
   本报告私自转让、涂改或以任何媒体形式篡改无效。
5. If any test method is deviation from the designated test method, must be commented in the test data sheet.
   如果报告中部分项目相对于测试依据有偏离的，需在当前测试项目中予以说明。
6. Objections to the test report must be submitted to lab 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。
7. The test report is valid for the tested sample only.
   本报告仅对测试样品有效。

*****End of Report 报告结束*****