UN38.3

Report No.:CESUN190403010

检　测　报　告

TEST REPORT

Name of Sample: Lithium-ion Power Battery

产品名称　：　锂离子动力电池

Model Specification:

产品型号：　JRTG-10S3P

Client: Shenzhen JiaRuiTaiGe Technology Co., Ltd.

委托单位　：　深圳市嘉瑞泰格科技有限公司

Classification of Test: Commission Test

委托类别：　委托测试

国家轻工业电池及储能材料质量监督检测中心

先进储能材料国家工程研究中心有限责任公司检测中心

National Light Industry Quality Supervision and Testing Center of Battery Energy Storage Materials

Test Center of Advanced National Engineering Research Center of Storage Materials

说　明
Marking

1. 报告无“检测报告专用章”或“检测单位公章”无效。
   The test report is invalid without “Special seal for inspection report” or “Inspection official seal “of Test Center.
2. 复制报告未重新加盖“检测报告专用章”或“检测单位公章”无效。
   The copied report is invalid without restamping the "special seal for inspection report" or "inspection official seal".
3. 报告无批准人、审核人和主检人签名无效。
   The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
4. 报告涂改无效。
   The test report is invalid if altered
5. 对检测报告若有异议，应于收到报告之日起十五天内向检测单位提出。
   Objections to the test report must be submitted to Test Center within15 days.
6. 报告仅对送检样品负责。
   The test report is Valid for the tested samples only.
7. 本报告检测结论中“N/A”表示“不适用”，“P”表示“符合标准要求”，“F”表示“不符合标准要求”。
   As for test result, ”N/A” means is “not applicable”, “P” means “pass”, “F” means “fail”.

检测单位地址：广东省深圳市宝安区新安街道宝石路29号蓝坤集团大厦B栋1楼
Lab Address: 1/F, Lankun Group Building B, No.29, Baoshi road, Xin’an Street, Bao’an District, Shenzhen City, Guangdong Province, China
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邮政编码(Post Code)：518101
E-mail：ces_sztc@corun.com

TEST REPORT

Name of samples: Lithium-ion Power Battery 样品名称：锂离子动力电池	Trade mark: --- 商标：---
Type/Model: 型号规格：JRTG-10S3P （36V 7.5Ah 270Wh）	Sample status: The samples is good
Commissioned by: Shenzhen JiaRuiTaiGe Technology Co., Ltd. 委托单位：深圳市嘉瑞泰格科技有限公司	Commissioner address: Floor 4th, Dahong Science Park, 3 Zhensheng Road, Qinghuang Village, Qingxi Town, Dongguan City, Guangdong Province, China 委托单位地址：东莞市清溪镇青皇村振升 3 路大鸿科技园 4 楼
Manufacturer: Shenzhen JiaRuiTaiGe Technology Co., Ltd. 生产单位：深圳市嘉瑞泰格科技有限公司	Manufacturer address: Floor 4th, Dahong Science Park, 3 Zhensheng Road, Qinghuang Village, Qingxi Town, Dongguan City, Guangdong Province, China 生产单位地址：东莞市清溪镇青皇村振升 3 路大鸿科技园 4 楼
Quantity of sample: 16 packs, 25 cells 样品数量：16 个电池，25 个电芯	Sampled identification: 样品标识序号：b1#-b16#，c1#-c25#
Classification of Test: Commission Test 检测类别：委托测试	Size of Product（L×W×T）: 产品尺寸：297.0mm×69.4mm×36.8mm
Receiving Date: 接样日期：2019-04-10	Completing Date: 完成日期：2019-04-15
Tested according to: 测试标准：ST/SG/AC.10/11/Rev.6/Section 38.3	Test item: 8 items 测试项目：8项

Test conclusion:

检测结论：

The Rechargeable Li-ion Battery submitted by Shenzhen JiaRuiTaiGe Technology Co., Ltd. are 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). The test items are full items. The test results comply with the relevant requirements of the standard.

由深圳市嘉瑞泰格科技有限公司送检的可充电锂离子电池，依据《关于危险品货物运输的建议书》试验和标准手册第六修订版第38.3节进行检测，试验为全项目，测试结果符合标准相关要求。

The test results: pass.

检测结果：通过。

Seal of CES
CES印章
Date of issue:
签发日期:：2019 年 04 月 19 日

Approved by：(批准） Reviewed by：（审核） Tested by：（主检）

TEST REPORT

Description and illustration of the sample:
样品说明及描述：
The sample's status is good.
样品状况良好。

Test item 测试项目	Sample No. 样品编号	State 状态	Remark 备注
T.1~T.5	b1#~b4#	at first cycle, in fully charged state 第一个交替充电放电周期完全充电状态	-
	b5#~b8#	at fifty cycle, in fully charged state 第五十个交替充电放电周期完全充电状态	-
T.6	c1#~c5#	at first cycle at 50% of the design rated capacity 第一个交替充电放电周期充电到设计额定容量的 50%	-
T.7	b9#~b12#	at first cycle, in fully charged state 第一个交替充电放电周期完全充电状态	-.
	b13#~b16#	at fifty cycle, in fully charged state 第五十个交替充电放电周期完全充电状态	
T.8	c6#~c15#	at first cycle, in fully discharged state 第一个交替充电放电周期完全放电状态	-
	c16#~c25#	after fifty cycles ending in fully discharged state 第五十个交替充电放电周期完全放电状态	-

Description of the sampling procedure:
取样程序的说明：

/

Description of the deviation from the standard, if any:
测试结果不符合标准项的说明：

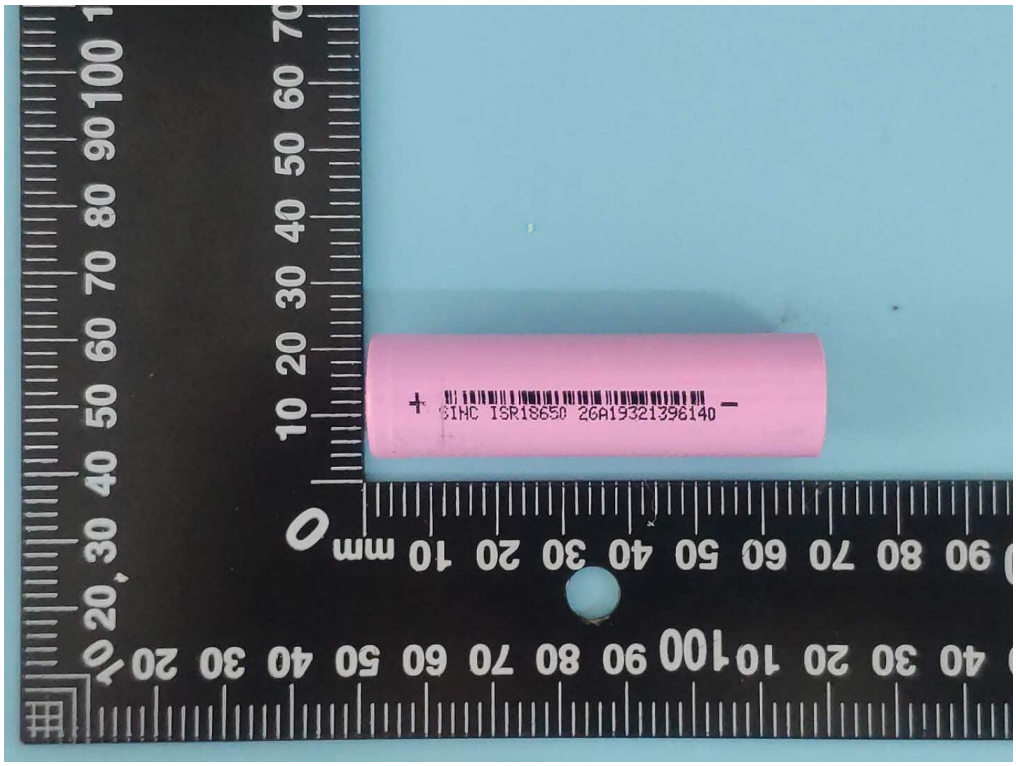
/

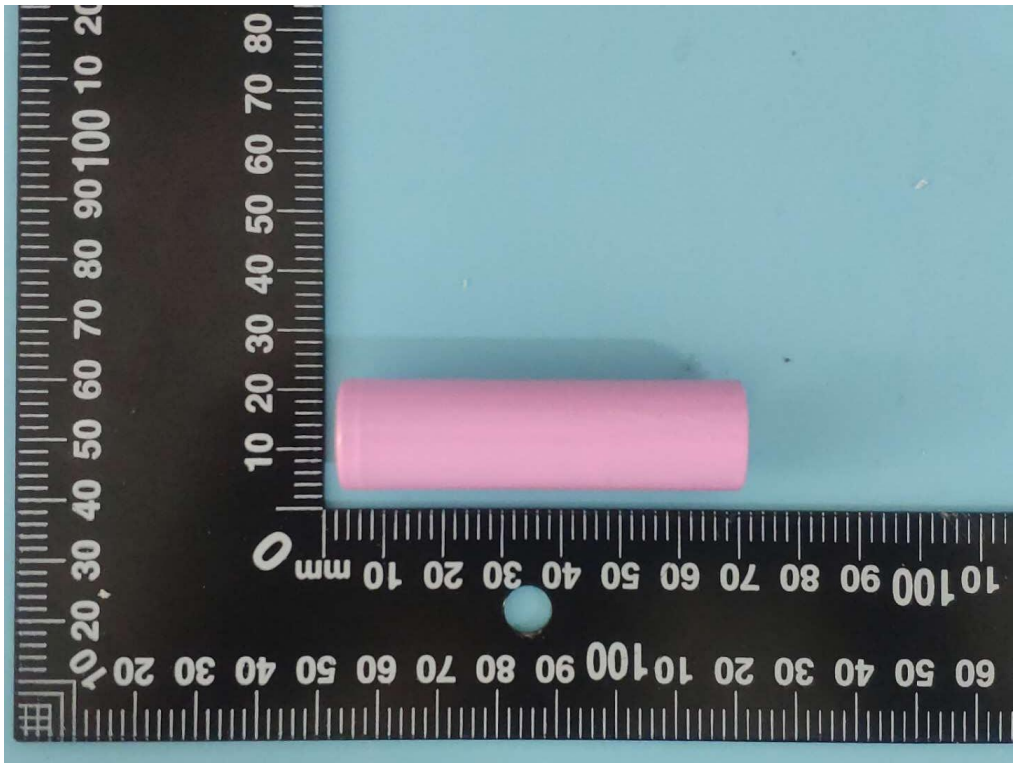
Remarks:
备注： /

Photos of Samples and Labels/样品照片及标识

Battery /电池（JRTG-10S3P 36V 7.5Ah 270Wh）

Cell /电芯（ISR18650　3.6V 2500mAh 9Wh）





ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4	**Procedure/测试步骤**		—
38.3.4.1	**Test 1: Altitude simulation/测试 1：高度模拟**		P
	Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hour at ambient temperature (20±5℃)/ 将电芯和电池在温度为 20±5℃，大气压力为不大于 11.6kpa 的环境中贮存不少于 6 个小时。		
	Requirement/标准要求： 1. Cells and batteries Mass loss limit: ≤0.1% /样品质量损失≤0.1%。 2. Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states/样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放完电的电池和电芯。 3. No leakage, no venting, no disassembly, no rupture and no fire /样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生。	The samples b1#~b8# : No leakage, no venting, no disassembly, no rupture and no fire/ 编号为b1#~b8#的样品：无漏液、无排气、无解体、无破裂以及无着火现象 The data see table1/数据见表1	
38.3.4.2	**Test 2: Thermal test/测试 2：温度循环**		P
	Test cells and batteries are to be stored for/电芯和电池存储条件如下： 1.one temperature cycle: 75±2℃(6h) —-40±2℃(6h) /一次温度循环为75±2℃(6h)—-40±2℃(6h)。 2.The maximum time interval between test temperature extremes is 30 minutes/温度转换最大间隔时间为30min。 3.This procedure is to be repeated 10 times/重复10次循环。 4.after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5℃)/循环结束后，电芯和电池在20±5℃的条件下搁置24小时。		
	Requirements/标准要求 1.Cells and batteries Mass loss limit: ≤0.1% /样品质量损失≤0.1%。 2.Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states/样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放完电的电芯和电池。 3. No leakage, no venting, no disassembly, no rupture and no fire/样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生。	The samples b1#~b8# : No leakage, no venting, no disassembly, no rupture and no fire/ 编号为b1#~b8#的样品：无漏液、无排气、无解体、无破裂以及无着火现象 The data see table1/数据见表 1	

ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4	**Test 3: Vibration/测试 3：振动**		
38.3.4.3	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 7Hz and 200Hz and back to 7Hz traversed in 15 minutes/振动以正弦波形式，以7Hz增加至200Hz，然后在减少回到7Hz为一个循环，一个循环持续15分钟的对数前移传送。 3.The logarithmic frequency sweep is as follows/对数扫频为: (1)For cells and small batteries: from 7 Hz a peak acceleration of 1gn 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 8gn occurs (approximately 50Hz), A peak acceleration of 8gn is then maintained until the frequency is increased to 200Hz/对于电芯和小型电池：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8gn（频率约为50赫兹），将最大加速度保持在8gn直到频率增加到200赫兹。 (2) For large batteries: from 7Hz to a peak acceleration of 1gn is maintained until 18Hz 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 2gn occurs (approximately 25Hz). A peak acceleration of 2gn is then maintained until the frequency is increased to 200Hz/对于大型电池组：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2gn（频率约为25赫兹），将最大加速度保持在2gn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，每个方向3个小时，共9小时。		P
	Requirements/标准要求 1. Cells and batteries Mass loss limit: ≤0.1% /样品质量损失≤0.1%. 2. Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states/样品试验后开路电压应不低于试验前开路电压的90%,此要求不适用于完全放完电的电池和电芯。 3. No leakage, no venting, no disassembly, no rupture and no fire/样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生。	The samples b1#~b8# : No leakage, no venting, no disassembly, no rupture and no fire/编号为b1#~b8#的样品：无漏液、无排气、无解体、无破裂以及无着火现象 The data see table1/数据见表1	

ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4.4	**Test 4: Shock/测试 4：加速度冲击** 1.Test cells and batteries shall be secured to the testing machine/以稳固的托架固定住每个电芯和电池样品的全部配件表面。 2. Each cell shall be subjected to a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds. 对每个电芯以峰值为150gn的半正弦的加速度冲击，脉冲持续6毫秒，大型电芯须经受最大加速度50gn和脉冲持续时间11毫秒的半正弦波冲击。 3. Small batteries shall be subjected to a half-sine shock of peak acceleration of 150gn (or Acceleration(g_n) = $\sqrt{\left(\frac{100850}{mass}\right)}$,which is smaller)and pulse duration of 6 milliseconds. Large batteries shall be subjected to a half-sine shock of peak acceleration of 50gn (or Acceleration(g_n) = $\sqrt{\left(\frac{30000}{mass}\right)}$,which is smaller)and pulse duration of 11 milliseconds. 对每个电池以峰值为150gn（或与 $\sqrt{\left(\frac{100850}{mass}\right)}$ 中的较小值）的半正弦波加速度冲击，脉冲持续6毫秒，大型电池组须经受最大加速度50gn（或与 $\sqrt{\left(\frac{30000}{mass}\right)}$ 中较小值）和脉冲持续时间11毫秒的半正弦波冲击。 3 .Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks/每个电池或电池组须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受18次冲击。		P
	Requirements/标准要求： 1 .Cells and batteries Mass loss limit: ≤0.1% /样品质量损失≤0.1% 2. Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states/样品试验后开路电压应不低于试验前开路电压的90％,此要求不适用于完全放完电的电池和电芯。 3. No leakage, no venting, no disassembly, no rupture and no fire/样品（电池）应无漏液、无排气、无解体、无破裂以及无着火现象的发生。	The samples b1#~b8# : Acceleration=150 gn No leakage, no venting, no disassembly, no rupture and no fire/编号为b1#~b8#的样品：峰值加速度：150 gn 无漏液、无排气、无解体、无破裂以及无着火现象。The data see table1/数据见表1	

ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4.5	**Test 5: External Short Circuit/测试 5 :外部短路**		P
	1.The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57±4℃/保持试验环境温度稳定在57±4℃，以使电芯或电池样品外表温度达到57±4℃。 2. the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0,1 ohm at 57±4℃, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57±4℃/将样品正负极用小于0.1Ω的总电阻回路进行短路，样品的外表温度恢复到57±4℃之后保持短路状态1小时以上。 3. the cell or battery must be observed for a further six hour for the test to be concluded/对电芯或电池必须进一步观察 6 个小时才能下结论。		
	Requirements/标准要求： During the test and within six hours after test ,the cells or batteries/在测试过程中以及之后6个小时内，电芯或电池样品 1. External temperature not exceed 170℃/外表温度不超过170℃。 2. No disassembly, no rupture and no fire/无解体、无破裂和无着火现象发生。	The samples b1#~b8# ： no disassembly, no rupture and no fire/ 编号为b1#~b8#的样品：无解体、无破裂以及无着火现象 The data see table1/数据见表1	
38.3.4.6	**Test 6: Impact / Crush / 测试 6：撞击/挤压**		P
	Impact (applicable to cylindrical cells not less than 18mm in diameter) /撞击（适用于直径不小于18毫米的圆柱形电池）		
	1. This test sample cell or component cell is to be placed on a flat smooth surface/将试验样品用的电芯或聚合物电芯放在一个平坦光滑的平面上。 2. A 15.8 mm diameter bar is to be placed across the center of the sample, A 9.1kg mass is to be dropped from a height of 61±2.5cm onto the sample/将一直径为15.8mm 的横木横过电池中部放置后，将一质量为9.1kg 的物体从61±2.5cm的高度落向样品。 3. The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm ± 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact/接受撞击的试样，纵轴应与平坦的表面平行并与横放在试样中心的直径15.8±0.1 毫米弯曲表面的纵轴垂直。每一个试样只经受一次撞击。		P

ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4.6	Requirements/标准要求： 1. Cells external temperature not exceed 170℃/电芯或电池的最高表面温度应不超过170℃。 2 .No disassembly, no rupture and no fire within six hours of this test./试验结束后6 个小时之内，电芯和聚合物电芯应无解体和无着火现象发生。	The samples c1#~c5#: no disassembly, no rupture and no fire/ 编号为c1#~c5#的样品：无解体、无着火现象 The data see table2/数据见表2	P
	Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter)/挤压（适用于棱柱形、袋装、硬币/纽扣电池和直径小于18毫米的圆柱形电池）		N/A
	1. A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached/将电池或元件电池放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为1.5 厘米/秒。挤压持续进行，直到出现以下三种情况之一： (a) The applied force reaches 13kN ± 0.78kN /施加的力达到13千牛±0.78千牛 (b) The voltage of the cell drops by at least 100mV/电池的电压下降至少100毫伏 (c) The cell is deformed by 50% or more of its original thickness/电池变形达原始厚度的50%以上。 2. A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces/棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币形电池应从其平坦表面施压。圆柱形应从与纵轴垂直的方向施压。		
	Requirements/标准要求： 1. Cells external temperature not exceed 170℃/电芯或电池的最高表面温度应不超过170℃。 2.No disassembly, no rupture and no fire within six hours of this test/试验结束后6个小时之内，电芯和聚合物电芯应无解体和无着火现象发生。	---	
38.3.4.7	**Test 7: Overcharge/测试 7：过充电**		P
	1. The charge current shall be twice the manufacturer’s recommended maximum continuous charge current/以2倍制造厂推荐的最大持续充电电流对样品充电 2 .The minimum voltage of the test shall be as follows/本测试最小电压为:		

ST/SG/AC.10/11/Rev.6/Section 38.3			
Clause 章节	**Requirements 标准要求**	**Result 测试结果**	**Verdict 判定**
38.3.4.7	a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V/如果厂家推荐的充电电压不超过18V，本测试的最小充电电压应是厂家标定最大充电电压的两倍或者是22V之中的较小者。 b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be1.2 times the maximum charge voltage/如果厂家推荐的充电电压超过18V，本测试的最小充电电压应是厂家标定最大充电电压的1.2倍。 3. Tests are to be conducted at ambient temperature 20±5℃, The duration of the test shall be 24 hours/20±5℃的环境温度下，试验持续24小时。	The voltage of the test is 50.4V, and the current is 7.5A 测试的电压为50.4V ，电流为7.5A	P
	Requirements/标准要求: No disassembly and no fire within seven days of this test/试验样品在试验中和试验后7 天内，应无解体和无着火现象发生。	The samples b9#~b16#:no disassembly, no rupture and no fire/编号为b9#~b16#的样品：无解体、无着火现象The data see Table3/数据见表3	
38.3.4.8	**Test 8: Forced discharge/测试 8：强制放电**		P
	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer/20±5℃的环境温度下，将单个电芯连接在12V 的直流电源上进行强制放电，此直流电源提供给每个电芯初始电流为制造厂指定的最大放电电流。		
	The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere)/指定的放电电流通过串联在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）。		
	Requirements/标准要求: No disassembly and no fire within seven days of this test/试验样品在试验中和试验后7 天内，应无解体和无着火现象发生。	The samples c6#~c25#:no disassembly, no rupture and no fire/编号为c6#~c25#的样品：无解体、无着火现象 The data see Table4/数据见表4	

Table1

Table1：T1~T5 / 表1, 试验1~试验5									
项目		b1#	b2#	b3#	b4#	b5#	b6#	b7#	b8#
OCV prior to test 试验前电压(V)		41.85	41.87	41.87	41.88	41.88	41.87	41.87	41.88
Mass prior to test 试验前质量(g)		1500.81	1499.58	1596.95	1499.78	1515.96	1505.43	1511.48	1498.27
Test 1: Altitude Simulation 测试 1：高度模拟	Mass loss 质量损失(%)	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.002
	Change ratio 电压比(%)	100	99.952	100	100	99.952	100	100	99.976
Test 2: Thermal test 测试 2: 热冲击	Mass loss 质量损失(%)	0.014	0.012	0.014	0.017	0.011	0.012	0.013	0.009
	Change ratio 电压比(%)	99.092	99.044	98.949	98.973	98.949	98.997	98.949	98.997
Test 3: Vibration 测试 3: 振动	Mass loss 质量损失(%)	0.001	0.000	0.002	0.000	0.000	0.002	0.000	0.000
	Change ratio 电压比(%)	99.952	99.976	100	99.976	100	100	100	99.952
Test 4: Shock 测试 4: 冲击	Mass loss 质量损失(%)	0.001	0.002	0.000	0.000	0.001	0.000	0.002	0.000
	Change ratio 电压比(%)	100	100	99.976	100	100	99.952	100	100
Test 5: External Short Circuit 测试 5 外接短路	Temp (℃) 温度 (℃)	54.5	54.7	54.8	54.5	54.8	54.9	54.5	54.5

Table2

Table2: Impact /表 2:撞击						
Test 6: Impact 测试6:撞击	Sample No, 样品号	c1#	c2#	c3#	c4#	c5#
	OCV prior to test 试验前电压（V）	3.908	3.909	3.909	3.909	3.910
	Temp, (℃) 温度 (℃)	102.7	103.5	100.8	103.9	100.6

Table3

Table3：Overcharge Test of batteries/ 表 3 电池过充试验									
Test 7: Overcharge 测试7:过充电	Sample No, 样品号	b9#	b10#	b11#	b12#	b13#	b14#	b15#	b16#
	OCV prior to test 试验前电压（V）	41.88	41.82	41.88	41.85	41.85	41.88	41.85	41.87

Table4

Table 4：Forced discharge / 表 4：强制放电											
Test 8: Forced discharge 测试8: 强制放电	Sample No, 样品号	c6#	c7#	c8#	c9#	c10#	c11#	c12#	c13#	c14#	c15#
	OCV prior to test 试验前电压(V)	3.327	3.332	3.336	3.334	3.325	3.326	3.324	3.322	3.329	3.334
	Sample No, 样品号	c16#	c17#	c18#	c19#	c20#	c21#	c22#	c23#	c24#	c25#
	OCV prior to test 试验前电压(V)	3.337	3.332	3.332	3.328	3.325	3.329	3.331	3.335	3.332	3.328

-- End of Report --