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No. :RZUN2019-6362

检测报告 TEST REPORT

UN38.3

NAME OF SAMPLE:	Rechargeable Li-ion Battery				
产品名称:	可充锂离子电池				
CLIENT:	Zhengzhou BAK Battery Co., Ltd				
委托单位:	郑州比克电池有限公司				
CLASSIFICATION OF TEST:	Commission Test				
检测类别:	委托测试				



检测报告

TEST REPORT

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Name of samples: Rechargeable Li-ion Battery 样品名称:可充锂离子电池	Type/Model: 型号规格: ACC8100 3,7V 1000mAh 3,7Wh
Color: White 样品颜色:白色	Physical shape: Prismatic 样品形状: 棱柱形
Commissioned by: Zhengzhou BAK Battery Co., Ltd 委托单位: 郑州比克电池有限公司	Manufacturer: Zhengzhou BAK Battery Co., Ltd 制造商: 郑州比克电池有限公司
Commissioner address: LiuQiao Village Zheng An town Zhongmou county Zhengzhou city Henan 451450 P. R. China. 委托单位地址: 河南省郑州市中牟县郑庵镇刘巧村委	Manufacturer address: LiuQiao Village Zheng An town Zhongmou county Zhengzhou city Henan 451450 P. R. China. 制造商地址: 河南省郑州市中牟县郑庵镇刘巧村委
Classification of test: Commission Test 检测类别: 委托测试	Quantity of sample: 40 cells 样品数量: 40 个电芯
Tested according to: 测试标准: ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3	Sample identification: 样品标识序号: c1#~c40#
Receiving date: 接样日期: 2020-01-09	Means of receiving: Submitted by commissioner 接样方式: 委托单位送样
Completing date: 完成日期: 2020-02-28	Test item: 8 items 测试项目: 8 项

Test conclusion:

检测结论:

The Rechargeable Li-ion Batteries submitted by Zhengzhou BAK Battery Co., Ltd are tested according to Section 38.3 of the Sixth revised Edition Amendment 1 of the Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3). The test items are full items. The test results comply with the relevant requirements of the standard.

由郑州比克电池有限公司送检的可充锂离子电池,依据《关于危险货物运输的建议书》试验和标准手册第 六修订版修正 1 第 38.3 节进行检测,试验为全项目,测试结果符合标准相关要求。

E项目,测试结果符合标准相 Sear of CVC CVC 印章 Date of issue:2020-05-28

Wei Grahma

Title:Manager批准人职务:经理

Approved by: Reviewed by: Tested by:

批准: Huangkur ak: zhang si Yao 检测:

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Description and illustration of the sample:

样品说明及描述:

The sample's status is good

样品状况良好。

Cell Dimensions/电芯尺寸: 5,2mm×34mm×50mm

Test item	Sample No.	State	Remark
测试项目	样品编号	状态	备注
	c1#~c5#	at first cycle, in fully charged states 第一个交替充电放电周期完全充电状态	
T.1~T.5	c6#~c10#	after 25 cycles ending in fully charged states 第 25 个交替充电放电周期完全充电状态	-
Т.6	c11#~c15#	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%	
1.6	c16#~c20#	after 25 cycles ending at 50% of the design rated capacity 第 25 个交替充电放电周期充电到设计额 定容量的 50%	-
	c1#~c4#	at first cycle, in fully charged states 第一个交替充电放电周期完全充电状态	using undamaged samples previously
T.7 c5#~c8#		after 25 cycles ending in fully charged states 第 25 个交替充电放电周期完全充电状态	used in tests T.1 to T.5 使用试验 T.1 至 T.5 未 损坏的样品
	c21#~c30#	at first cycle, in fully discharged states 第一个交替充电放电周期完全放电状态	-
T.8	c31#~c40#	after 25 cycles ending in fully discharged states 第 25 个交替充电放电周期完全放电状态	-

Description of the deviation from the standard, if any:

测试结果不符合标准项的说明:

/

Remarks:

备注:

Throughout this report a comma is used as the decimal separator.

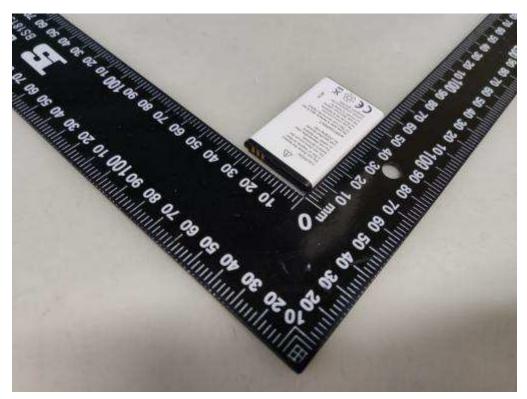
本报告中以逗号代替小数点。

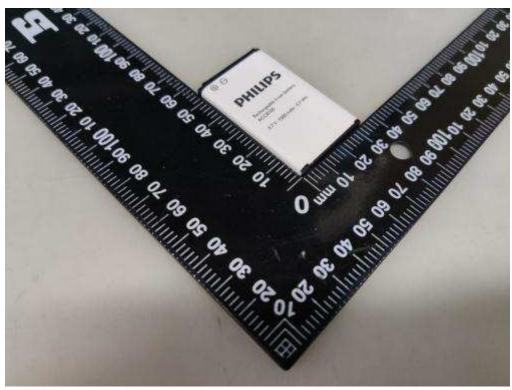
The Rechargeable Li-ion Batteries submitted by Zhengzhou BAK Battery Co., Ltd are single cell batteries. According to the standard, a single cell battery is considered a "cell" and shall be tested according to the testing requirements for "cell".

郑州比克电池有限公司所送的可充锂离子电池是单电芯电池。根据标准要求,单电芯电池被视为"电芯",须根据"电芯"的实验要求进行试验。

Photos of Samples and Labels/样品照片及标识

Single Cell Battery /单电芯电池 (ACC8100 3,7V 1000mAh 3,7Wh)





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ST/SG/AC.10/11/Rev.6/Amend.1/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		_					
	Test 1: Altitude simulation/测试 1: 高度模拟							
	Test cells and batteries shall be stored at a pressure six hours at ambient temperature (20±5℃)/ 将电芯利压力为不大于 11,6kpa 的环境中贮存不少于 6 个小时							
	Requirement/标准要求:							
38.3.4.1	1 Cells and batteries Mass loss limit: ≤0,2% /样品质量损失≤0,2%	The samples c1#~c10#: No leakage, no venting, no	P					
300.111	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	disassembly, no rupture and no fire/ 编 号 为 c1#~c10#的样品:无漏液、无排气、无解体、无破裂以及无着火现象	•					
	%,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							
	Test 2: Thermal test/测试 2: 热冲击							
	Test cells and batteries are to be stored for/电池存储条件如下:							
	1 For small cells and batteries: one temperature cycle: 72±2℃(6h) —-40±2℃(6h) /对于小电芯和电池: 一次温度循环为 72±2℃(6h) —-40±2℃(6h)							
	For large cells and batteries: one temperature cycle: 72±2℃(12h) —-40±2℃(12h) /对于大电芯和电池: 一次温度循环为 72±2℃(12h) —-40±2℃(12h)							
	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 社							
38.3.4.2	4 after which all test cells and batteries are to be st temperature (20±5℃)/循环结束后,电池在 20±5℃的		P					
	Requirements/标准要求							
	1 Cells and batteries Mass loss limit: ≤0,2% /样品质量损失≤0,2%	The samples c1#~c10# : No leakage, no venting, no						
	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	disassembly, no rupture and no fire/ 编 号 为 c1#~c10#的样品: 无漏液、 无排气、无解体、无破裂以及无着火现象 The data is shown in Table 1./数据见表 1						
	及无着火现象的发生							

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ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3						
Clause Requirements 章节 标准要求	Result 测试结果	Verdict 判定				
Test 3: Vibration/测试 3: 振动 1 Cells and batteries are firmly secured to the platform 恋和电池率固地安装在振动台(的台面)上 2 The vibration: a sinusoidal waveform with a logarithm 200Hz and back to 7Hz traversed in 15 minutes/振动上至 200Hz,然后在减少回到 7Hz 为一个循环,一个循环送。 3 For cells and small batteries: from 7 Hz a peak acceler until 18Hz is reached. The amplitude is then maintain excursion) and the frequency increased until a peak (approximately 50Hz). A peak acceleration of 8gn is frequency is increased to 200Hz. / 对于电芯和小型电池值加速度保持不变,直到频率增加到 200Hz。 For large batteries: from 7Hz a peak acceleration of 1g, reached. The amplitude is then maintained at 0.8mm(原有的现象,直到频率增加到 200Hz。 For large batteries: from 7Hz a peak acceleration of 2gn is then maintain increased. The amplitude is then maintained at 0.8mm(总备有的出现 2gn 的峰值加速度(大约 25Hz)。然后保持 2gn 13 Hz 2gn 14 Hz 2gn 15 Hz 2gn 16 Hz 2gn 16 Hz 2gn 16 Hz 2gn 16 Hz 2gn 17 Hz 2gn 16 Hz 2gn 17 Hz 2gn 18 Hz 2gn 19 Hz 2gn 1	of the vibration machine /电 nic sweep between 7Hz and 以正弦波形式,以 7Hz 增加不持续 15 分钟的对数前移传 eration of 1gn is maintained ned at 0.8mm (1.6mm total acceleration of 8gn occurs then maintained until the 1: 从 7Hz 开始,以 1gn 的峰 E 0.8mm(总偏移 1.6mm)。然后保持 8gn 的峰值加速 n. is maintained until 18Hz is 1.6mm total excursion) and 2gn occurs (approximately ned until the frequency is 以 1gn 的峰值加速度保持不移 1.6mm)并且频率增加直加速度保持不移 1.6mm)并且频率增加直加速度,直到频率增加有16 for each of three mutually directions of vibration must 一个方向必须是垂直样品极	P				

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	ST/SG/AC.10/11/Rev.6/Amend.1/Se	ection 38.3	
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定
	标准要求 Test 4: Shock/测试 4: 冲击 1 Test cells and batteries shall be secured to the tes 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 o and pulse duration of 6 milliseconds. Large cells ma shock of peak acceleration of 50 g _n and pulse duratio 电芯以峰值为 150g _n 的半正弦的加速度撞击,脉冲持线大加速度 50g _n 和脉冲持续时间 11 毫秒的半正弦波冲击 Small batteries shall be subjected to a half-sine shoce g _n (or Acceleration(g _n)= √(100850/mass), which is small milliseconds, large batteries shall be subjected to a hof 50 g _n (or Acceleration(g _n)= √(30000/mass), which is small milliseconds/对每个电池以峰值为 150g _n (或与√(30000/mass)) 中的较小值)和脉冲持续时间 11 毫秒的半 3 Each cell or battery shall be subjected to three sh followed by three shocks in the negative direction of mounting positions of the cell or battery for a total of 须在三个互相垂直的电池安装方位的正方向经受三次沿击,总共经受 18 次冲击。 Requirements/标准要求: 1 Cells and batteries Mass loss limit: ≤0,2% /样品质量损失≤0,2% 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	wids果 ting machine/以稳固的托架固 f peak acceleration of 150 gn y be subjected to a half-sine n of 11 milliseconds. / 对每个 读 6 毫秒,大型电芯须经受最 fn。 k of peak acceleration of 150 der) and pulse duration of 6 malf-sine of peak acceleration maller) and pulse duration of 100850 中的较小值)的半正 经受最大加速度 50gn(或与 正弦波冲击。 100850 中的较小值)的半正 2008年中地域是为 正弦波冲击。 100850 中的较小值)的中正 2008年中地域是为 正弦波冲击,接着在反方向经受三次 100850 中古,接着在反方向经受三次 100850 中古,接着在反方向经过,在一方的是一方的是一方的是一方的是一方的是一方的是一方的是一方的是一方的是一方的是	
	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 data is shown in Table 1./数据见表 1	

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	ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3						
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定				
J.u.u.o.o	标准要求 Test 5: External Short Circuit/测试 5:外部短路 1The cell or battery to be tested shall be heated for reach a homogeneous stabilized temperature 57±4° 度稳定在 57±4°C 2 The cell or battery shall be subjected to a short external resistance of less than 0,1 ohm at 57±4°C, continued for at least one hour after the cell or batter has returned to 57±4°C/将样品正负极用小于 0,1Ω的外表温度恢复到 57±4°C之后保持短路状态 1 小时以上3 The cell or battery must be observed for a furthe 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:	测试结果 a period of time necessary to C/加热电芯或电池样品直到温 circuit condition with a total This short circuit condition is ry external case temperature 总电阻回路进行短路,样品的。					
	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 c1#~c10#: no disassembly, no rupture and no fire/编号为c1#~c10#的样品:无解体、无破裂以及无着火现象 The data is shown in Table 1./数据见表 1						

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ST/SG/AC.10/11/Rev.6/Amend.1/Section 38.3							
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定				
	Test 6: Impact / Crush / 测试 6: 撞击/挤压		Р				
	Impact (applicable to cylindrical cells not less than 18r 撞击(适用于直径不小于 18 毫米的圆柱形电池)	mm in diameter) /					
	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						
	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。						
	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 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	-					
38.3.4.6	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) 1 A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1,5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. / 将电池或元件电池放在两个平面之间挤压,挤压力度逐渐加大,在第一个接触点上的速度大约为 1,5 厘米/秒。挤压持续进行,直到出现以下三种情况之一: (a) The applied force reaches 13 kN ± 0,78 kN. / 施加的力达到 13kN±0,78kN (b) The voltage of the cell drops by at least 100 mV./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. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. /核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℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度应不超过 170℃。电芯或电池的最高表面温度 11#~c20#: no disassembly and no fire/编号为 c11#~c20#的样品:无解体、无着火现象 The data is shown in Table and the surfaces.						

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	ST/SG/AC.10/11/Rev.6/Amend.1/Se	ection 38.3					
Clause 章节	Requirements 标准要求	Result 测试结果	Verdict 判定				
38.3.4.7	Test 7: Overcharge/测试 7: 过充电 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/本测试最小电压见下文						
	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 be 1,2 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。 Requirements/标准要求:	The voltage of the test is 8,4V, and the current is 2,0A 测试的电压为 8,4V,电流为 2,0A	P				
	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。	c1#~c4# ,c41#~c44#: For voltage data before test, see table 3. / 试验前电压见表 3 no disassembly, no rupture and no fire/编号为 c1#~c4#, c41#~c44# 的 样品: 无解体、无着火现象					
	Test 8: Forced discharge/测试 8: 强制放电						
	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。						
38.3.4.8	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 c21#~c40#: no disassembly and no fire/编号为 c21#~c40#的 样品: 无解体、无着火现 象 The data is shown in Table 4./数据见表 4					

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	Table1: T1~T5 / 表 1. 试验 1~试验 5											
Mass OCV Sampl prior to prior to e No. test / 试 test /试 样品号 验前质量 验前电		to prior to simulation/ 试 test /试 测试 1:高度模拟			Test 2: Thermal test/ 测试 2: 热冲击		Test 3: Vibration/ 测试 3: 振动		Test 4: Shock/ 测试 4: 冲击			
	(g)	压(V)	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. (℃) 温度 (℃)	
c1#	21,490	4,187	0,004	99,67	0,000	98,68	0,004	99,93	0,000	99,95	57,4	
c2#	21,238	4,190	0,000	99,67	0,004	98,71	0,000	99,93	0,004	99,95	57,9	
c3#	20,739	4,189	0,004	99,67	0,004	98,56	0,000	99,95	0,000	99,95	57,5	
c4#	21,043	4,189	0,000	99,64	0,004	98,71	0,000	99,95	0,000	99,93	57,1	
c5#	20,926	4,191	0,000	99,64	0,009	98,68	0,000	99,93	0,000	99,95	57,6	
c6#	21,122	4,189	0,000	99,62	0,004	98,66	0,000	99,95	0,000	99,98	57,8	
c7#	21,194	4,190	0,000	99,62	0,004	98,68	0,004	99,93	0,000	99,95	57,2	
c8#	21,271	4,188	0,000	99,59	0,004	98,68	0,000	99,93	0,000	99,98	57,5	
c9#	21,013	4,189	0,000	99,62	0,004	98,73	0,000	99,93	0,000	99,95	57,6	
c10#	20,817	4,191	0,000	99,62	0,004	98,75	0,000	99,90	0,000	99,95	57,3	

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	Table2: Crush /表 2:挤压										
Test 6: Crush/测 试 6:挤压	Sample No. 样品号	c11#	c12#	c13#	c14#	c15#	c16#	c17#	c18#	c19#	c20#
	OCV prior to test / 试验前电压(V)	3,710	3,707	3,713	3,709	3,711	3,706	3,712	3,708	3,711	3,709
	Temp. (℃) 温度 (℃)	24,3	24,1	24,7	23,9	24,0	24,1	23,7	24,2	23,8	24,2

	Table3: Overcharge Test of batteries/ 表 3 电池过充试验									
Test 7: Overcharg e /测试 7: 过充电	Sample No. 样品号	c1#	c2#	c3#	c4#	c41#	c42#	c43#	c44#	
	OCV prior to test /试 验前电压(V)	4,177	4,175	4,178	4,176	4,180	4,179	4,182	4,178	

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	c21#	c22#	c23#	c24#	c25#	c26#	c27#	c28#	c29#	c30#
	OCV prior to test / 试验前电压(V)	3,305	3,296	3,312	3,309	3,301	3,295	3,299	3,306	3,310	3,303
	Sample No. 样品号	c31#	c32#	c33#	c34#	c35#	c36#	c37#	c38#	c39#	c40#
	OCV prior to test / 试验前电压(V)	3,321	3,330	3,325	3,317	3,324	3,322	3,316	3,320	3,328	3,332

注意事项 Important

1. 报告无检测单位印章无效。

The test report is invalid without the official stamp of CVC.

- 2. 未经本试验室书面同意,不得部分地复制本报告。
 Nobody is allowed to photocopy or partly photocopy this test report without written permission of CVC.
- 3. 本报告无批准人、审核人及检测人签名无效。
 The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
- 4. 本报告涂改无效。

The test report is invalid if altered,

- 5. 对检测报告若有异议,应于收到报告之日起十五天内向检测单位提出。 Objections to the test report must be submitted to CVC within 15 days,
- 6. 本报告仅对送检样品负责。
- The test report is valid for the tested samples only.
 7. 判定栏中"-"表示"不需要判定","P"表示"通过","F"表示"不通过",

7. 判定栏中"-"表示"个需要判定","P"表示"通过","F"表示"个通过", "N/A"表示"不适用"。

As for the Verdict, "-" means "no need for judgement", "P" means "pass", "F" means "fail" and "N/A" means "not applicable".

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