

Report No.:  
报告编号: KL20191220UA501

# 检验报告

TEST REPORT

NAMEOFSAMPLE:Lithium-ion Battery Pack

产品名称: 聚合物锂离子电池

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CLIENT: Kiel Technology(Hong Kong)Limited

委托单位: 奇奥科技(香港)有限公司

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CLASSIFICATIONOFTEST: Commission test

检验类别: 委托检测

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广州邦禾检测技术有限公司

Guangzhou MCM Certification and Testing Co.,Ltd



<b>UN 38.3 :2009/联合国专家委员会关于危险品的运输建议书</b>	
<b>Applicant information</b> 申请资料	
Name of samples 样品名称	Lithium-ion Battery Pack 聚合物锂离子电池
Type/Model 型号规格	AM-700995 3.7V 6000mAh 22.2Wh
Trademark 商标	
Commission by 委托单位	Kiel Technology(Hong Kong)Limited 奇奥科技（香港）有限公司
Commissioner address 委托单位地址	Unit2111,Wayson Comm Bldg, 28 Connaguht Rd West, Sheung Wan, HK 香港上環干諾道西 28 號威勝商業大廈 21 樓 2111 室
Manufacturer 制造商	Xiamen AnRan Dynamic Electronic Co.,Ltd 厦门安燃动力电子有限公司
Manufacturer address 制造商地址	5/F, 42 YiAi Road, SiMing District, Xiamen, China 福建省厦门市思明区谊爱路 42 号 5 楼
Factory 生产厂	Xiamen AnRan Dynamic Electronic Co.,Ltd 厦门安燃动力电子有限公司
Factory address 生产厂地址	5/F, 42 YiAi Road, SiMing District, Xiamen, China 福建省厦门市思明区谊爱路 42 号 5 楼
Appearance 样品外观颜色	—
Sample status 样品状态	Good 完好
Package of goods 样品外包装	Carton 纸箱
Quantity of sample 样品数量	60pcs
Sample identification 样品标识序号	b1#~b16# ;c1#~c25#
Reference standard 参考标准	MH/T1052-2013 《Tests for lithium batteries transported by air》 MH/T1052-2013 《航空运输锂电池测试规范》
Receiving date 接样日期	2019.12.06
Completing date 完成日期	2019.12.20

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## Test Conclusion

## 测试结论

No. 序号	Name of test 测试项目名称	Testing standard 测试标准	Test result 测试结果	Conclusion 本项结论	Remarks 备注
1	Altitude simulation 高度模拟	UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.5,amend1,38.3. 联合国《关于危险货物运输的建议书试验和标准手册》 10/11/Rev. 5, amend1, 38.3.	See Appendix1 见附表 1	Passed 合格	/
2	Thermal test 温度试验		See Appendix2 见附表 2	Passed 合格	/
3	Vibration 振动		See Appendix3 见附表 3	Passed 合格	/
4	Shock 冲击		See Appendix4 见附表 4	Passed 合格	/
5	External Short-circuit 外部短路		See Appendix5 见附表 5	Passed 合格	/
6	Impact 撞击		/	/	N/A 不适用
	Crush 挤压		See Appendix6 见附表 6	Passed 合格	/
7	Overcharge 过度充电		/	/	N/A 不适用
8	Forced discharge 强制放电		See Appendix8 见附表 8	Passed 合格	/
9	Drop test 跌落测试	联合国《关于危险货物运输的建议书规章范本》(Rev.18)特殊规定 188 条款 UNITEDNATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Model Regulations(18 <sup>th</sup> ) special provisions 188	See Appendix9 见附表 9	Passed 合格	/

## Conclusion/结论:

The Lithium-ion Battery Packs submitted by Kiel Technology(Hong Kong)Limited had passed the test items of UNITEDNATIONS"Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria ST/SG/AC,10/11/Rev.5amend1,38.3.The package was capable of withstanding1,2m drop test of UNITEDNATIONS"Recommendations on the TRANSPORT OF DANGEROUSGOODS"Model Regulations(18th)special provisions188.

由奇奥科技（香港）有限公司送检的聚合物锂离子电池符合联合国《关于危险品货物运输的建议书试验和标准手册》ST/SG/AC,10/11/Rev.5amend1, 38.3的要求。包装符合联合国《关于危险货物 运输的建议书 规章范本》(Rev.18) 特殊规定 188 条款 1,2 米跌落测试要求。

Seal/公章:

Date of issue:/日期: Dec.20,2019

Approver: Xu Hongbin

Checker:Fu Ziwen

Tester:Lej Da

批准:

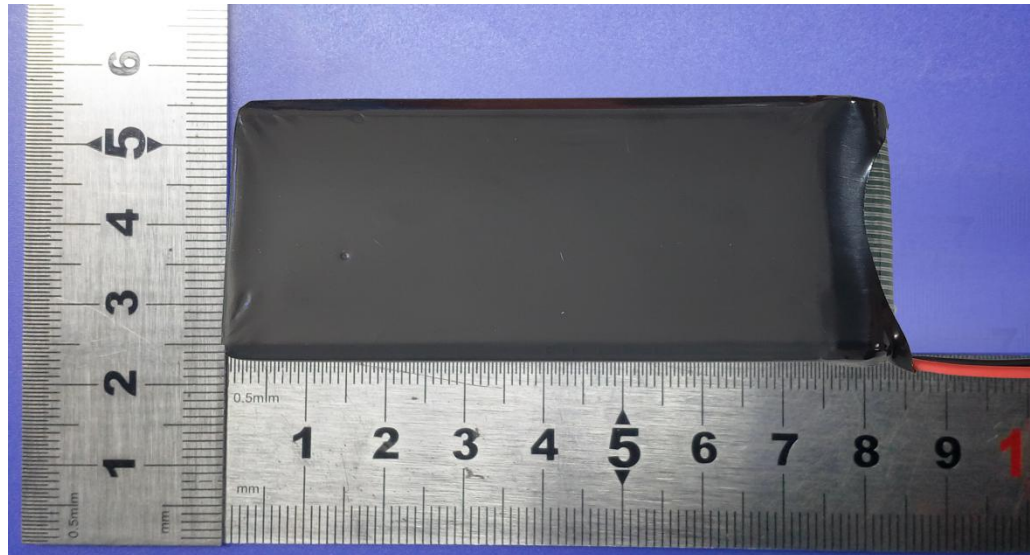
审核:

测试:

UN 38.3 :2009/联合国专家委员会关于危险品的运输建议书

Photos of samples and markings  
样品及标识照片

Battery (AM-700995 3.7V 6000mAh 22.2Wh)



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**Photos of samples and markings  
样品及标识照片**

**Drop test (before test)**



**After test**



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## Appendix 1

## 附表 1

Test Items 测试项目	Altitude simulation 高度模拟						
1,1	<b>Test procedure</b> 测试步骤						
	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℃).试验电池芯和电池在环境温度(20±5℃)下, 储存在小于等于 11, 6kPa 的压力下至少六小时。						
1,2	<b>Sample status</b> 样品状态						
	b1#~b4#,at first cycle in fully charged states. b1#~b4#, 在第一个循环完全充电的电池。						
	b5#~b8#,after 50 cycle sending in fully charged states. b5#~b8#, 在第五十个循环完全充电的电池。						
1,3	<b>Result</b> 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样 品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
b1#	84,163	4,18	84,163	4,18	0,000	100,00	O
b2#	84,078	4,19	84,078	4,19	0,000	100,00	O
b3#	84,842	4,19	84,842	4,19	0,000	100,00	O
b4#	84,956	4,19	84,956	4,19	0,000	100,00	O
b5#	84,152	4,19	84,152	4,19	0,000	100,00	O
b6#	84,111	4,18	84,111	4,18	0,000	100,00	O
b7#	84,838	4,19	84,838	4,19	0,000	100,00	O
b8#	84,600	4,19	84,600	4,19	0,000	100,00	O
Note:L-Leakage,V-Venting,D-Disassembly,R-Rupture,F-Fire,O-No leakage,no venting,no disassembly,no rupture,no fire. 注: L- 泄漏; V-排气; D-解体; R-破裂; F-起火; O-无泄漏、无排气、无解体、无破裂、无起火。							

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Appendix 2  
附表 2

Test Items 测试项目	Thermaltest 温度测试						
1,1	<b>Test procedure</b> 测试步骤						
	Test cells and batteries are to be stored for at least six hours at a test temperature equal to $72\pm 2^{\circ}\text{C}$ , followed by storage for at least six hours at a test temperature equal to $-40\pm 2^{\circ}\text{C}$ , The maximum time interval between test temperature extremes in 30 minutes, This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ( $20\pm 5^{\circ}\text{C}$ ). 将电芯和电池在温度为 $72\pm 2^{\circ}\text{C}$ 的条件下贮存不少于 6 个小时, 然后, 在温度 $-40\pm 2^{\circ}\text{C}$ 条件下贮存不少于 6 个小时两个温度间的间隔最长为 30min, 重复操作上述步骤直到 10 次, 然后, 将其在环境温度为 $20\pm 5^{\circ}\text{C}$ 的条件下放置 24 个小时。						
1,2	<b>Sample status</b> 样品状态						
	b1#~b4#, at first cycle in fully charged states. b1#~b4# 在第一个循环完全充电的电池。						
	b5#~b8#, after 50 cycles ending in fully charged states. b5#~b8#, 在第五十个循环完全充电的电池。						
1,3	<b>Result</b> 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
b1#	84,163	4,18	84,125	4,12	0,045	98,56	O
b2#	84,078	4,19	84,042	4,12	0,042	98,33	O
b3#	84,842	4,19	84,820	4,12	0,025	98,33	O
b4#	84,956	4,19	84,921	4,13	0,015	98,56	O
b5#	84,152	4,19	84,122	4,12	0,035	98,33	O
b6#	84,111	4,18	84,084	4,12	0,032	98,56	O
b7#	84,838	4,19	84,804	4,12	0,040	98,33	O
b8#	84,600	4,19	84,576	4,12	0,028	98,33	O
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting, no disassembly, no rupture, no fire. 注: L- 泄漏; V-排气; D-解体; R-破裂; F-起火; O-无泄漏、无排气、无解体、无破裂、无起火。							

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Appendix 3  
附表 3

Test Items 测试项目	Vibration 振动						
1,1	<b>Test procedure</b> 测试步骤						
	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 wave form with a logarithmic sweep between 7 Hz and 200 Hz and back to 7Hz traversed in 15minutes, This cycle shall be repeated 12 times for a total of 3hours fo reach of three mutually perpendicular mounting position of the cell. 将电芯和电池牢固地安装在振动台的台面上，然后开始振动。振动以正弦波形式，以 7Hz 增加至 200Hz，然后再减少回到 7Hz 为一个循环，一个循环持续 15 分钟的对数扫频。每个电芯和电池从三个互相垂直的方向上循环 12 次，3 个小时。						
1,2	<b>Sample status</b> 样品状态						
	b1#~b4#,at first cycle in fully charged states. b1#~b4#，在第一个循环完全充电的电池。						
	b5#~b8#,after 50 cycles ending in fully charged states. b5#~b8#，在第五十个循环完全充电的电池。						
1,3	<b>Result</b> 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测试结果
	Mass 样 品质量 (g)	Voltage 开路电压 (V)	Mass 样 品质量 (g)	Voltage 开路电压 (V)			
b1#	84,125	4,12	84,125	4,12	0,000	100,00	O
b2#	84,042	4,12	84,042	4,12	0,000	100,00	O
b3#	84,820	4,12	84,820	4,12	0,000	100,00	O
b4#	84,921	4,13	84,921	4,13	0,000	100,00	O
b5#	84,122	4,12	84,122	4,12	0,000	100,00	O
b6#	84,084	4,12	84,084	4,12	0,000	100,00	O
b7#	84,804	4,12	84,804	4,12	0,000	100,00	O
b8#	84,576	4,12	84,576	4,12	0,000	100,00	O
Note:L-Leakage,V-Venting,D-Disassembly,R-Rupture,F-Fire, O-No leakage,no venting,no disassembly, no rupture,no fire. 注：L- 泄漏；V- 排气；D-解体；R-破裂；F- 起火；O-无泄漏、无排气、无解体、无破裂、无起火。							



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Appendix 4  
附表 4

Test Items 测试项目	Shock 冲击						
1,1	<b>Test procedure</b> 测试步骤						
	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 battery, Each cell or battery shall be subjected to a half-sine 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 fora total of 18 shocks. 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。对每个电芯或电池以峰值为150gn 的半正弦的加速度撞击，脉冲持续6 毫秒。按三个互相垂直轴向分别对其正负极各碰撞三次，每个电芯或电池碰撞总次数为18 次。						
1,2	<b>Sample status</b> 样品状态						
	b1#~b4#,at first cycle in fully charged states. b1#~b4#在第一个循环完全充电的电池。						
	b5#~b8#,after 50 cycles ending in fully charged states. b5#~b8#，在第五十个循环完全充电的电池。						
1,3	<b>Result</b> 测试结果						
Sample No. 样品编号	Before 测试前		After 测试后		Mass loss 质量损失 (%)	Residual OCV 剩余电压 (%)	Test result 测 试结果
	Mass 样 品质量 (g)	Voltage 开路电压 (V)	Mass 样 品质量 (g)	Voltage 开路电压 (V)			
b1#	84,125	4,12	84,125	4,12	0,000	100,00	<b>O</b>
b2#	84,042	4,12	84,042	4,12	0,000	100,00	<b>O</b>
b3#	84,820	4,12	84,820	4,12	0,000	100,00	<b>O</b>
b4#	84,921	4,13	84,921	4,13	0,000	100,00	<b>O</b>
b5#	84,122	4,12	84,122	4,12	0,000	100,00	<b>O</b>
b6#	84,084	4,12	84,084	4,12	0,000	100,00	<b>O</b>
b7#	84,804	4,12	84,804	4,12	0,000	100,00	<b>O</b>
b8#	84,576	4,12	84,576	4,12	0,000	100,00	<b>O</b>
Note:L-Leakage,V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage,no venting, no disassembly, no rupture,no fire. 注: L- 泄漏; V-排气; D-解体; R-破裂; F-起火; O-无泄漏、无排气、无解体、无破裂、无起火。							

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## Appendix 5

## 附表 5

Test Items 测试项目	External short circuit 外部短路		
1,1	<b>Test procedure</b> 测试步骤		
	<p>The cell or battery to be tested shall be temperature stabilized so that its external case Temperature reaches <math>55\pm 2^{\circ}\text{C}</math> and then the cell or battery shall be subjected to a short Circuit condition with a total external resistance of less than <math>0,1\text{ohm}</math> at <math>55\pm 2^{\circ}\text{C}</math>, This short circuit condition is continued for at least one hour after the cell or battery external Case temperature has returned to <math>55\pm 2^{\circ}\text{C}</math>, the cell or battery must be observed for a Further six hour for the test to be concluded.</p> <p>保持试验环境温度稳定在 <math>55\pm 2^{\circ}\text{C}</math>，以使电芯或电池样品外表温度达到 <math>55\pm 2^{\circ}\text{C}</math>，然后，在此温度下，将其正负极用小于 0,1 欧姆的线路短接，待电芯或电池的外表温度恢复到 <math>55\pm 2^{\circ}\text{C}</math> 之后再持续 1 小时以上，对电芯或电池必须进一步观察 6 个小时才能下结论。</p>		
1,2	<b>Sample status</b> 样品状态		
	<p>b1#~b4#, at first cycle in fully charged states. b1#~b4# 在第一个循环完全充电的电池。</p> <p>b5#~b8#, after 50 cycles ending in fully charged states. b5#~b8#，在第五十个循环完全充电的电池。</p>		
1,3	<b>Result</b> 测试结果		
Sample No. 样品编号	Max.External Temperature 样品表面最高温度 ( $^{\circ}\text{C}$ )	Test result 测试结果	Remark 备注
b1#	54,2	O	/
b2#	52,4	O	/
b3#	51,7	O	/
b4#	52,6	O	/
b5#	52,5	O	/
b6#	54,3	O	/
b7#	54,6	O	/
b8#	53,1	O	/
<p>Note: D -Disassembly, R -Rupture, F-Fire, O-no disassembly,no rupture,no fire. 注：D-解体；R-破裂；F-起火；O-无解体、无破裂、无起火。</p>			

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## Appendix 6

## 附表 6

Test Items 测试项目	Crush 挤压		
1,1	<b>Test procedure</b> 测试步骤		
	<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 1,5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.</p> <p>The applied force reaches 13kN±0,78kN; The voltage of the cell drops by at least 100 mV; or</p> <p>(c) The cell is deformed by 50% or more of its original thickness.</p> <p>Once the maximum pressure has been obtained, the voltage drops by 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.</p> <p>电池芯或组成电池芯在两个平面间挤压。挤压在第一个接触点以约 1,5cm/s 的速度慢慢进行，直到下面三个选项之一达到为止：</p> <p>(a) 作用力达到 13kN±0,78kN；(b) 电池芯电压降至少达到 100mV；</p> <p>(c) 电池厚度和最初比较变形至少 50%。</p> <p>一旦达到最大压力，电压降超过 100mV 或者电池芯变形超过 50%，压力应该解除。</p>		
1,2	<b>Sample status</b> 样品状态		
	C1#~C5#, at first cycle at 50% of the design rated capacity; C1#~C5#, 在第一个循环 50% 的额定容量；		
1,3	<b>Result</b> 测试结果		
Sample No. 样品编号	Max. External Temperature 样品表面最高温度 (°C)	Test result 测试结果	Remark 备注
C1#	24,2	O	/
C2#	24,1	O	/
C3#	24,5	O	/
C4#	24,2	O	/
C5#	24,4	O	/
<p>Note: D-Disassembly, F-Fire, O-no disassembly, no fire. 注: D-解体; F-起火; O-无解体、无起火。</p>			

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Appendix 7  
附表 7

Test Items 测试项目	Overcharge 过度充电		
1,1	<b>Test procedure</b> 测试步骤		
	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 or22V 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该是两倍的厂家推荐最大充电电压或者是 22V	/	
	When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1,2 times 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该为 1, 2 倍的厂家推荐最大充电电压	/	
1,2	<b>Sample status</b> 样品状态		
	b9#~b12#, at first cycle in fully charged states. b9#~b12#, 在第一个循环完全充电的电池。		
	b13#~b16#, after 50 cycles ending in fully charged states. b13#~b16#, 在第五十个循环完全充电的电池。		
1,3	<b>Result</b> 测试结果		
Sample No. 样品编号	Voltage Before test (V) 测试前开路电压 (V)	Test result 测试结果	Remark 备注
b9#	/	/	/
b10#	/	/	/
b11#	/	/	/
b12#	/	/	/
b13#	/	/	/
b14#	/	/	/
b15#	/	/	/
b16#	/	/	/
Note: D -Disassembly, F-Fire, O-nodisassembly, no fire. 注: D-解体; F-起火; O-无解体、无起火。			

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Appendix 8  
附表 8

Test Items 测试项目	Forced discharge 强制放电				
1,1	<b>Test procedure</b> 测试步骤				
	<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 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).</p> <p>在 20±5℃的环境温度下,将单个电芯连接在 12V 的直流电源及所串联的适当大小电阻负荷回路上进行强制放电, 此直流电源提供每个电芯初始电流为制造厂指定的最大放电电流, 放电时间为额定容量除以初始电流。</p>				
1,2	<b>Sample status</b> 样品状态				
	C6#~C15#,at first cycle in fully discharged states; C6#~C15#, 在第一个循环完全放电的电芯;				
	C16#~C25#,after 50 cycles ending in fully dis charged states; C16#~C25#, 在第五十个循环完全放电的电芯;				
1,3	<b>Result</b> 测试结果				
Sample No. 样品编号	Voltage Before test 测试前开路电压 (V)	Test result 测试结果	Sample No. 样品编号	Voltage Before test 测试前开路电压 (V)	Test result 测试结果
C6#	3,171	O	C16#	3,196	O
C7#	3,184	O	C17#	3,197	O
C8#	3,106	O	C18#	3,110	O
C9#	3,115	O	C19#	3,107	O
C10#	3,125	O	C20#	3,123	O
C11#	3,110	O	C21#	3,197	O
C12#	3,111	O	C22#	3,102	O
C13#	3,116	O	C23#	3,101	O
C14#	3,120	O	C24#	3,111	O
C15#	3,111	O	C25#	3,117	O
Note:D -Disassembly,F-Fire,O-no disassembly, no fire. 注: D-解体; F-起火; O-无解体、无起火。					

## UN 38.3 :2009/联合国专家委员会关于危险品的运输建议书

## Appendix 9

## 附表 9

Test Items 测试项目	Drop test 跌落测试		
1,1	<b>Test procedure</b> 测试步骤		
	The package of batteries is dropped from 1,2m in any orientation. The test floor is concrete floor. 电池的包装件以任意方向从 1, 2 米跌落至水泥地面。		
	Each package is capable of withstanding a 1,2m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents. 每个电池的包装件以任意方向从 1, 2 米跌落, 而没有造成包装件内的电池或电芯的损坏, 也没有移动包装件内的电池或电芯使其相互接触以及包装件内的电池或电芯漏出。		
1,2	<b>Package information</b> 包装信息		
	Package weight (kg) 包装重量 (kg)	8.9	
	Package size 包装箱尺寸	380mm × 230mm × 170mm	
	Net weight of batteries or cells per package (kg) 单个包装件内电池或电芯的净重量 (kg)	0,084	
	Number of batteries or cells per package (pcs) 包装件内含电池或电芯的数量 (pcs)	100	
1,3	<b>Result</b> 测试结果		
	No battery is damaged or connected by neighbor, the battery should not be released from package. 包装件内的电池或电芯无损坏, 无相互接触。包装件内的电池或电芯不能从包装件漏出。	Surface 面跌落	The package is not cracked, the contents are not damaged and not shifted. 包装未破裂, 内装物完好。
		Arris 棱跌落	The package is not cracked, the contents are not damaged and not shifted. 包装未破裂, 内装物完好。
		Angle 角跌落	The package is not cracked, the contents are not damaged and not shifted. 包装未破裂, 内装物完好。

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### Important1.

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