
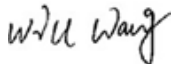


UN38.3 检测报告 UN 38.3 TEST REPORT UN 38.3, Rev.6 《关于危险货物运输的建议书—试验和标准手册》第三部分 38.3 节《金属锂电池和锂离子电 池组》 Recommendations on the TRANSPORT OF DANGEROUS GOODS-Manual of Tests and Criteria", Sixth revised edition , Part III, 38.3"Lithium metal and lithium ion batteries"(UN 38.3).	
报告 (Report)	
报告号(Reference No.)	180801301SHA-002
测试(Tested by) (+ signature).....	Michael Zheng 
审核(Approved by) (+ signature)	Will Wang 
报告日期 (Date of issue).....	2019-02-19
内容(Contents).....	16 页 (pages)
测试实验室 (Testing laboratory)	
名称(Name).....	上海天祥质量技术服务有限公司 Intertek Testing Services Shanghai
地址(Address)	中国上海市钦州北路 1198 号 86 号楼 Building No.86, 1198 Qinzhou Road (North), 200233 Shanghai, China
测试地点 (Testing location).....	同上 (Same as above)
客户 (Client)	
名称 (Name).....	杭州南都电源销售有限公司 Hangzhou Narada Sales Co., Ltd.
地址 (Address)	浙江省杭州市西湖区文二西路 822 号 1 幢 C 座 C Wing, No.822 Wen'er West Road, Xihu District, Hangzhou, Zhejiang, P.R.China
测试详情 (Test specification)	
标准 (Standard).....	ST/SG/AC.10/11/Rev.6, Part III, Subsection 38.3
测试流程 (Test procedure)	测试报告 (Testing)
流程差异 (Procedure deviation)	不适用 (N/A)
非标准测试方法 (Non-standard test method).....	不适用 (N/A)
报告模板 (Test Report Form/blank test report)	
报告模板号 (Test Report Form No). .:	UN 38.3A
编制者 (Test Report Form(s))	上海天祥质量技术服务有限公司
Originator).....	Intertek Testing Services Shanghai

测试项 (Test item)	
描述 (Description)	二次可充锂离子电池 (Secondary (rechargeable) Li-ion battery)
商标 (Trademark):	
型号 (Model):	Battery: 51.2NESP200 Cell: ICP36/130/240 (FE105A)
制造商 (Manufacturer):	杭州南都动力科技有限公司 Hangzhou Narada Motive Power Science&Technology Co.,Ltd 浙江省杭州市余杭区余杭经济开发区宏达路 120 号 No.120 Hongda Road, Yuhang Economic Development Zone of Yuhang District, Hangzhou, Zhejiang,P.R.China
联系人 (Contact):	项海锋 (Xiang Haifeng)
电话 (Phone):	+86-15088766527
邮箱 (Email):	allen@narada.biz
额定参数 (Rating(s)):	Battery: 51.2VDC, 200Ah, 10240Wh Cell: 3.2V 100Ah 320Wh

商标 (Marking):

电池商标 (Battery):

Polarity: +

Polarity: -

- Secondary (Rechargeable) Li-ion battery
- Battery Designation: 51.2NESP200 (16ICP36/130/240-2)
- Data of Manufacture: dd mm yyyy
- Manufacture: Zhejiang Narada Power Source Co., Ltd.
- Rated Capacity: 200Ah, 10240Wh
- Nominal Voltage: 51.2VDC

电芯商标 (Cell):

Polarity: +

Polarity: -

Secondary (Rechargeable) Li-ion Cell

ICP36/130/240 (FE105A)

3.2VDC, 100Ah, 320Wh

Data of Manufacture: 2nd Match 2019

Batch number (W19B13)

Zhejiang Narada Power Source Co., Ltd.

Note: The manufacturing date is expressed as dd mm yyyy. For example, 15th January 2019.

详细测试信息和要求 (Particulars: test item vs. test requirements)

电池类型 (Type of Battery) : 可充锂离子电池(Rechargeable Li-ion Battery module)

电池标称电压 (Nominal Voltage of battery) : 51.2V

电池重量 (Weight of battery)..... : 大约 (Approx). 89kg

电池充电电压 (Charge voltage of battery) : 57.6V

电池最大充电电流 (Max. charge current of battery) .. : 200A

电芯型号 (Cell model)..... : ICP36/130/240 (FE105A)

电芯数量 (Cell number) : 16 节串联 2 组并联(each 16pcs in series and 2 cell strings in parallel)

电芯标称容量 (Nominal capacity of cell)..... : 100Ah

电芯重量 (Weight of cell) : 2300g

电芯尺寸 (Size of cell) : 36*130*240mm (T*W*L)

电池最大充电电流 (Maximum discharge current of cell) : 100A

测试评定 (Test case verdicts)

评估项不适用 (Test case does not apply to the test object) : N/A

评估项符合要求 (Test item does meet the requirement) : P(ass)

评估项不符合要求 (Test item does not meet the requirement) : F(ail)

测试 (Testing)

收样日期 (Date of receipt of test item) : 2018-12-21

测试日期 (Date(s) of performance of test) : 2018-12-24 to 2019-02-11

评注信息 (General remarks):

在未得到实验室的书面授权情况下，本测试报告不能被复制。

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

本报告中显示的测试结果仅与相关测试项有关。

The test results presented in this report relate only to the item tested.

测试结果的确定基于 IEC Guide 115 的不确定度考虑。

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

本报告中点作为小数点表示。

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

电池样品充放电预处理由工厂根据 38.3.3 章节完成。

The samples are executed necessary charging and discharging procedures according the Chapter 38.3.3 of this standard in the factory.

此次测试的可充锂电池型号为 51.2NESP200，内部装有 32 节 16 串 2 并电芯，电芯型号为 ICP36/130/240 (FE105A)

The products covered by this report are Rechargeable Li-ion Battery Pack, model no. is 51.2NESP200. Cell which equipped with each 16pcs in series and 2 cell strings in parallel, cell's model no. is ICP36/130/240 (FE105A).

测试综述 (Summary of testing):

测试结果表明送检样品符合标准 **ST/SG/AC.10/11/Rev.6, Part III, Subsection 38.3**

The results indicate that the specimen complies with standard ST/SG/AC.10/11/Rev.6, Part III, Subsection 38.3

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测试综述 (Summary of testing):

<p>测试条款 Tests performed (name of test and test clause):</p>	<p>测试地点 (Testing location):</p>
<p>电池 (Battery):</p>	<p>上海天祥质量技术服务有限公司 Intertek Testing Services Shanghai</p>
<p>试验 T.1 高度模拟 38.3.4.1 Test 1: Altitude simulation</p>	<p>中国上海市钦州北路 1198 号 86 号楼 Building No.86, 1198 Qinzhou Road (North),</p>
<p>试验 T.2 温度试验 38.3.4.2 Test 2: Thermal Test</p>	<p>200233 Shanghai, China</p>
<p>试验 T.3 振动 38.3.4.3 Test 3: Vibration</p>	
<p>试验 T.4 冲击 38.3.4.4 Test 4: Shock</p>	
<p>试验 T.5 外部短路 38.3.4.5 Test 5: External short circuit</p>	
<p>试验 T.7 过度充电 38.3.4.7 Test 7: Overcharge</p>	
<p>电芯 (Cell):</p>	
<p>试验 T.6 挤压 38.3.4.6 Test 6: Crush (for cell)</p>	
<p>试验 T.8 强制放电 38.3.4.8 Test 8: Forced discharge (for cell)</p>	

38.3.4.1		试验 T.1 高度模拟 (Test 1: Altitude simulation)						P	
大气压强: Test pressure:		≤11.6 kPa		环境温度: Ambient temperature (°C):		20±5°C			
测试时间: Test duration:		≥6 hours							
要求 Requirement:		<ul style="list-style-type: none"> ● 质量损失不超过 0.1%。No mass loss: mass loss does not exceed 0.1%. ● 无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, no venting, no disassembly, no rupture and no fire. ● 试验后开路电压不小于试验前电压的 90%。After testing, voltage of fully charged battery shall ≥90% voltage before test. 							
测试数据: Data Record:									
型号 Model	样品号 Sample No	样品状态 Sample Status	测试前 Before test		测试后 After test		质量损失比 Mass Loss (%)	残余电压 Residual OCV(%)	其他现象 Other Event
			重量 Weight (g)	开路电压 OCV(v)	重量 Weight (g)	开路电压 OCV(v)			
51.2NE SP200	1	第一个放电周期充满电 at first cycle, in fully charged state	89045	53.643	89045	53.641	0	99.996	No
	2		89100	53.062	89100	53.059	0	99.995	No
	3	25 个充放电周期后充满电 after 25 cycles ending in fully charged	88958	53.643	88958	53.641	0	99.996	No
	4		89002	53.946	89002	53.942	0	99.993	No
备注 Note: L-渗漏 Leakage; V-排气 Venting; D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, No venting, No disassembly, No rupture, No fire.									

38.3.4.2		试验 T.2 温度试验 Test 2: Thermal Test		P
测试温度 1 Test temperature 1 (°C):	72±2°C	测试时间 1 Test duration 1:	≥12 hours	
间隔时间 Interval time:	≤30min			
测试温度 2 Test temperature 2 (°C):	-40±2°C	测试时间 2 Test duration 2:	≥12 hours	
间隔时间 Interval time:	≤30min			
环境温度 Ambient temperature (°C):	20±5°C			
重复 10 次之后 After 10 times repeated test:				
测试温度 3 Test temperature 3 (°C):	20±5°C	测试时间 3 Test duration 3:	24 hours	
备注 Remark: 测试温度 1 和 2 对于大电池暴露时间为至少 12 小时。12 hours for large cell (>500g) and large battery (>12kg) in procedure 1 & 2.				
要求 Requirement:	<ul style="list-style-type: none"> ● 质量损失不超过 0.1%。No mass loss: mass loss does not exceed 0.1%. ● 无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, no venting, no disassembly, no rupture and no fire. ● 试验后开路电压不小于试验前电压的 90%。After testing, voltage of fully charged battery shall ≥90% voltage before test. 			

测试数据: Data Record:									
型号 Model	样品号 Sample No	样品状态 Sample Status	测试前 Before test		测试后 After test		质量损失比 Mass Loss (%)	残余电压 Residual OCV(%)	其他现象 Other Event
			重量 Weight (g)	开路电压 OCV(v)	重量 Weight (g)	开路电压 OCV(v)			
51.2NES P200	1	第一个放电周期 充满电 at first cycle, in fully charged state	89045	53.641	83969	52.652	0.057	98.157	No
	2		89100	53.059	85001	51.718	0.046	97.472	No
	3	25 个充放电周 期后充满电 after 25 cycles ending in fully charged	88958	53.641	85311	52.258	0.041	97.422	No
	4		89002	53.942	84107	52.828	0.055	97.935	No
备注 Note: L-渗漏 Leakage; V-排气 Venting; D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, No venting, No disassembly, No rupture, No fire.									

38.3.4.3		试验 T.3 振动 Test 3: Vibration						P	
测试条件 Test conditions:		<ul style="list-style-type: none"> ● 正弦波对数频率扫描从 7 赫兹到 200 赫兹再回到 7 赫兹，跨度 15 分钟须对三个互相垂直的电池安装方位每一个方向重复 12 次，总共 3 小时，其中一个振动方向必须与端面垂直。Sinusoidal waveform with logarithmic sweep, three directions mutually perpendicular mounting of cell, one must be perpendicular to terminal face. ● 7 赫兹开始保持 1 g_n 的最大加速度，直到频率达到 18 赫兹。7Hz-18Hz maintained in 1 g_n peak acceleration ● 振幅保持在 0.8 毫米（总偏移 1.6 毫米），并增加频率只最大加速度到 2 g_n，保持直至频率到 200 赫兹。Then amplitude at 0,8 mm (1,6mm total excursion), increasing frequency till 2 g_n peak acceleration occurs (approximately 25Hz), maintain it till 200Hz. 							
第一次垂直安装方向 First mutually perpendicular mounting direction:									
测试频率 Test frequency(Hz):		7 to 200 to 7		测试时间 Test duration:		15 min			
重复次数 Repeat times:		12		总时间 Total duration:		3 hours			
第二次垂直安装方向 Second mutually perpendicular mounting direction:									
测试频率 Test frequency(Hz):		7 to 200 to 7		测试时间 Test duration:		15 min			
重复次数 Repeat times:		12		总时间 Total duration:		3 hours			
第三次垂直安装方向 Third mutually perpendicular mounting direction:									
测试频率 Test frequency(Hz):		7 to 200 to 7		测试时间 Test duration:		15 min			
重复次数 Repeat times:		12		总时间 Total duration:		3 hours			
环境温度 Ambient temperature (°C):		20±5°C							
要求 Requirement:		<ul style="list-style-type: none"> ● 质量损失不超过 0.1%。No mass loss: mass loss does not exceed 0.1%. ● 无渗漏，无排气，无解体，无破裂和无起火。No leakage, no venting, no disassembly, no rupture and no fire. ● 试验后开路电压不小于试验前电压的 90%。After testing, voltage of fully charged battery shall ≥90% voltage before test. 							
测试数据: Data Record:									
型号 Model	样品号 Sample No	样品状态 Sample Status	测试前 Before test		测试后 After test		质量损失比 Mass Loss (%)	残余电压 Residual OCV(%)	其他现象 Other Event
			重量 Weight (g)	开路电压 OCV(v)	重量 Weight (g)	开路电压 OCV(v)			
51.2NESP200	1	第一个放电周期充满电 at first cycle, in fully charged state	89045	53.6409	83969	52.652	0.006	99.993	No
	2		89100	53.0593	85001	51.718	0.009	99.999	No
	3	25 个充放电周期后充满电 after 25 cycles ending in fully charged	88958	53.6409	85311	52.258	0.005	99.993	No
	4		89002	53.9422	84107	52.828	0.004	99.996	No
备注 Note: L-渗漏 Leakage; V-排气 Venting; D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, No venting, No disassembly, No rupture, No fire.									

38.3.4.4		试验 T.4 冲击 Test 4: Shock		P
测试条件 Test conditions:				
<ul style="list-style-type: none"> 最大加速度 50 g_n 和脉冲持续时间 11 毫秒的半正弦波冲击 Half-sine shock, 150 g_n peak acceleration, 11 ms pulse duration for battery 				
第一次垂直安装方向 First mutually perpendicular mounting direction:				
正极方向 Positive direction:	3 shocks	负极方向 Negative direction:	3 shocks	
第二次垂直安装方向 Second mutually perpendicular mounting direction:				
正极方向 Positive direction:	3 shocks	负极方向 Negative direction:	3 shocks	
第三次垂直安装方向 Third mutually perpendicular mounting direction:				
正极方向 Positive direction:	3 shocks	负极方向 Negative direction:	3 shocks	
总共经受 18 次冲击 18 shocks for battery.				
环境温度 Ambient temperature (°C):		20±5°C		
要求 Requirement:				
<ul style="list-style-type: none"> 质量损失不超过 0.1%。No mass loss: mass loss does not exceed 0.1%. 无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, no venting, no disassembly, no rupture and no fire. 试验后开路电压不小于试验前电压的 90%。After testing, voltage of fully charged battery shall ≥90% voltage before test. 				

测试数据: Data Record:									
型号 Model	样品号 Sample No	样品状态 Sample Status	测试前 Before test		测试后 After test		质量损失比 Mass Loss (%)	残余电压 Residual OCV(%)	其他现象 Other Event
			重量 Weight (g)	开路电压 OCV(v)	重量 Weight (g)	开路电压 OCV(v)			
51.2NESP200	1	第一个放电周期充满电 at first cycle, in fully charged state	89045	53.6409	83969	52.652	0.006	99.998	No
	2		89100	53.0593	85001	51.718	0.01	99.995	No
	3	25 个充电周期后充满电 after 25 cycles ending in fully charged	88958	53.6409	85311	52.258	0.015	99.999	No
	4		89002	53.9422	84107	52.828	0.005	99.994	No
备注 Note: L-渗漏 Leakage; V-排气 Venting; D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无渗漏, 无排气, 无解体, 无破裂和无起火。No leakage, No venting, No disassembly, No rupture, No fire.									

38.3.4.5		试验 T.5 外部短路 Test 5: External short circuit		P
短路阻抗 External resistance:	< 0.1 ohm	外壳温度 External case temperature (°C):	57±4°C	
测试时间 Test duration:	≥1 hour			
要求 Requirement:	<ul style="list-style-type: none"> ● 外壳温度不超过 170°C。External case temperature does not exceed 170°C. ● 试验后 6 小时内无解体，无破裂，无起火。No disassembly, no rupture and no fire during the test and within 6 hours after the test 			

测试数据: Data Record:				
型号 Model	样品号 Sample No	样品状态 Sample Status	最大外表面温度 Max. External Temperature (°C)	其他现象 Other Event
51.2NESP200	1	第一个放电周期充满电 at first cycle, in fully charged state	75	No
	2		79	No
	3	25 个充放电周期后充满电 after 25 cycles ending in fully charged	76	No
	4		77	No
备注 Note: D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无解体，无破裂和无起火。No disassembly, No rupture, No fire.				

38.3.4.6	试验 T.6 挤压 Test 6: Crush	P
测试条件 Test conditions:	<ul style="list-style-type: none"> ● 两平面间挤压, 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。Crushed between two flat surfaces, gradual with a speed 1.5cm/s. ● 直到下面三种情况之一 Stopped when: ● 施加的力量达到 15 千牛顿±0.78 千牛顿。Crush force 13kN±0.78kN, or ● 电池电压下降至少 100 毫伏。Voltage of cell drops at least 100mV, or ● 电池变形达原始厚度的 50%或以上。Deformation over than 50%. 	
要求 Requirement:	<ul style="list-style-type: none"> ● 外壳温度不超过 170°C。External case temperature does not exceed 170°C. ● 试验后 6 小时内无解体, 无破裂, 无起火。No disassembly, no rupture and no fire during the test and within 6 hours after the test 	

测试数据: Data Record:				
型号 Model	样品号 Sample No	样品状态 Sample Status	最大外表面温度 Max. External Temperature (°C)	其他现象 Other Event
ICP36/130/240 (FE105A)	5	第一个放电周期	25	No
	6	50%容量充电 at first cycle at 50% of the design rated capacity	25	No
	7		25	No
	8		25	No
	9		25	No
备注 Note: D-解体 Disassembly; R-破裂 Rupture; F-起火 Fire; No-无解体, 无破裂和无起火。No disassembly, No rupture, No fire.				

38.3.4.7		试验 T.7 过度充电 Test 7: Overcharge		P
充电电流 Charging current:		制造商建议的最大持续充电电流的两倍 2×Max continuous charge current.		
充电电压 Charging voltage:	Recommend ≤18V	建议充电电压不大于 18V 时, 试验电压为 2 倍最大充电电压或 22V 中小者。2×Max charge voltage or 22V (lesser)	测试时间 Test duration:	24 hours
	Recommend >18V	建议充电电压大于 18V 时, 试验电压为最大充电电压的 1.2 倍。1.2×Max charge voltage		
环境温度 Ambient temperature (°C):		20±5°C		
要求 Requirement:		<ul style="list-style-type: none"> ● 试验过程中和试验后 7 天内无解体, 无起火。No disassembly and no fire within 7 day. 		

测试数据: Data Record:				
型号 Model	样品号 Sample No	样品状态 Sample Status	其他现象 Other Event	
51.2NESP200	10	第一个放电周期充满电 at first cycle, in fully charged state	No	
	11		No	
	12	25 个充放电周期后充满电 after 25 cycles ending in fully charged	No	
	13		No	
备注 Note: D-解体 Disassembly; F-起火 Fire; No-无解体, 和无起火。No disassembly, No fire.				

38.3.4.8		试验 T.8 强制放电 Test 8: Forced discharge		P
放电电压 Discharge voltage:	12V D.C. in series	放电电流 Discharge current:	指定最大放电电流 Specified Max current: ICP36/130/240: 125A	
放电设备 Discharge by:	阻性负载 Resistive load	时间 Time interval:	额定容量除以放电电流 Rated capacity/current: ICP36/130/240: 1hour	
环境温度 Ambient temperature (°C):	20±5°C			
要求 Requirement:	● 试验过程中和试验后 7 天内无解体, 无起火。No disassembly and no fire within 7 day.			

测试数据: Data Record:				
型号 Model	样品号 Sample No	样品状态 Sample Status	其他现象 Other Event	
ICP36/130/240 (FE105A)	14	第一个充放电周期完全放电 at first cycle, in fully discharged state	No	
	15		No	
	16		No	
	17		No	
	18		No	
	19		No	
	20		No	
	21		No	
	22	No		
	23	No		
	24	50个充放电周期后完全放电 after 50 cycles ending in fully charged	No	
	25		No	
	26		No	
	27		No	
	28		No	
	29		No	
30	No			
31	No			
32	No			
33	No			
备注 Note: D-解体 Disassembly; F-起火 Fire; No-无解体, 和无起火。No disassembly, No fire.				

测试样品照片 Photos of the product

电池外形 1



电池外形 2



电池外形 3



电芯外形



End of report