



匠芯定智 能启未来
CRAFTING INTELLIGENCE POWERING THE FUTURE



南屋科技(广州)有限公司
Nanwu Technology (Guangzhou) Co., Ltd

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NNS11588187 45Ah 电池产品规格书
Lithium-ion NNS11588187 45Ah Cell Product Specification

南屋科技
Nanwu Technology

NNS11588187 45Ah 锂离子单体电池
Lithium-ion NNS11588187 45Ah

产品规格书
Product Specification

产品型号
Product Model: NNS11588187 45Ah

| 制表 Prepared by | 审核 Checked by | 批准 Approved by |
|----------------|---------------|----------------|
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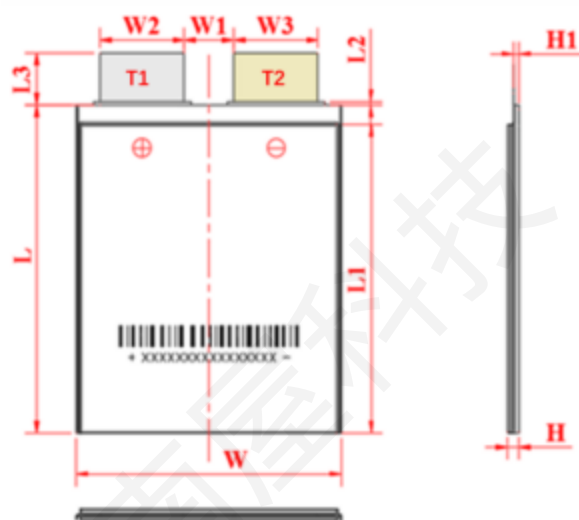
1. 适用范围 Application Scope

本产品规格书描述了 NNS11588187 型号锂离子电池产品性能指标。

This product specification describes the performance of NNS11588187 Lithium-ion Batteries.

2. 产品型号 Product Model

NNS11588187 45Ah



3. 产品尺寸 Product Size

| 项目 (Item) | 描述 (Description) | 尺寸 (Dimension) |
|-----------|--------------------------------|----------------|
| H | Cell Thickness /电芯最大厚度-50%SOC | 11.0mm |
| | Cell Thickness /电芯最大厚度-100%SOC | 11.5mm |
| W | Cell Width/电芯宽度 | 88±1mm |
| L | Cell Height/电芯高度 | 187±2mm |
| L3 | Cell Tab Length/电芯极耳长度 | 28±2mm |
| W1 | Cell Tab Spacing/电芯极耳间距 | 15±2mm |

| | | |
|-------|-------------------------------------|------------|
| W2/W3 | Cell Tab Width/电芯极耳宽度 | 25±0.2mm |
| T1 | Cell Tab Thickness-Al/铝转镍极耳厚度 | 0.4±0.02mm |
| T2 | Cell Tab Thickness-Ni-Cu-Ni/铜镀镍极耳厚度 | 0.3±0.02mm |
| L1 | Cell Packaging Film Length/电芯包装膜长度 | 180±0.2mm |
| L2 | Exposed Height of Tab Glue/极耳胶外露高度 | 0.5~2.75mm |
| H1 | Depth of The Packaging Film/包装膜坑深 | 5.75±0.1mm |

4. 产品规格 Product Specification

| No. (序号) | Item (项目) | Specification (规格) |
|----------|------------------------------------|--|
| 1 | Nominal Capacity 标称容量 | min.45000 mAh Typ. 0.2C discharge |
| 2 | Nominal Voltage 标称电压 | 3.5V platform voltage at 0.2C discharge |
| 3 | O.C.V 出货电压 | 3.6V~3.95V |
| 4 | AC Initial Impedance 初始内阻 | ≤0.8mΩ Measured at AC 1KHz |
| 5 | DC internal resistance 直流内阻 | ≤2.4mΩ 50% 1C 10s 25±3°C |
| 6 | Charge Ending Voltage 充电截止电压 | 4.3V |
| 7 | Discharge Ending Voltage 放电截止电压 | 2.5V T≥0°C 2.0V T<0°C |
| 8 | Charge Current 充电电流 | 25°C±5°C 0.2C constant current charge to 4.3V; then 4.3V constant voltage charge till the current declines to ≤ 0.05C 在 25°C±5°C的环境下；以 0.2C 恒流充至 4.3V；然后以 4.3V 恒定电压 充电；截至电流为 0.05C。 |
| 9 | Maximum Charge Current 最大充电电流 | Rapid charge:1C@(15°C~+40°C) 快速充电：1C@(15°C~+40°C) |

| | | | | |
|----|--|---|------------------------|--|
| 10 | Standard Discharge Current 标准放电电流 | 25±2°C, 0.2C constant current discharge to 2.5V. 在 25±2°C 的环境下, 以 0.2C 恒流放电至 2.5V。 | | |
| 11 | Maximum Continuous Discharge Current 最大持续放电电流 | 25±2°C, 2C constant current discharge to 2.5V. 在 25±2°C 的环境下, 以 2C 恒流放电至 2.5V。 | | |
| 12 | Pulse Discharging Current 脉冲放电电流 | 5C@10s (SOC>50%) | | |
| 13 | Operating Environment 工作环境 | Charge/充电 | 60±25%R.H. 0~50°C | High/low temperature environment reduce Cell charge efficiency and influence the service life of the Cell. Prolonged working under environment higher than 60°C will lead to Cell abnormal. 高/低温充电效率会下降, 会影响电池使用寿命, 长期在高于 60 度环境中使用会导致电池异常。 |
| | | Discharge/放电 | 60±25%R.H. -20~55°C | |
| 14 | Cell Weight 电芯重量 | About 397±12g 约 397±12g | | |
| 15 | Storage performance 储存性能 | Storage in a 50% SOC (Single Cell), humidity less than 85%RH. 50%SOC 电态储存(单体电芯), 湿度≤85%。 | | |

Recommended storage method:
建议储存方式:

1 year: -20°C~25°C (Charge and discharge the cell at 25±2°C every three months to maintain about 50% SOC.)

1 年: -20°C~25°C (每三个月需在 25±2°C 条件下充放电一次, 以保持约 50%SOC 的荷电状态)

3 months: -20°C~35°C 3 个月: -20°C~35°C

1 month: -20°C~45°C 1 个月: -20°C~45°C

Recommended Cell SOC Scope of use: 5%~95% 建议电池 SOC 使用范围: 5%~95%

5. 电池性能 Battery Performance

5.1 电化学性能 Electrochemical Characteristics

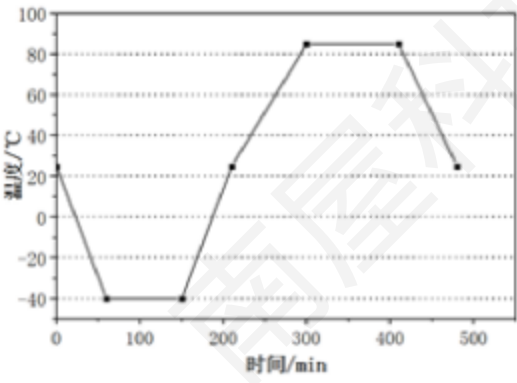
| 序号 NO. | Test Item 测试项目 | Specification 技术要求 | Condition 条件 |
|--------|---|---|---|
| 1 | Nominal Capacity 标称容量(0.2C) | \geq Nominal Capacity*100% \geq 标称容量*100% | The capacity shall be measured when the cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C under the condition of $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ after standard charge 电池按规定充电结束后；在 $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 的条件下以 0.2C 电流放电到 终止电压 2.5V 时的测量值。 |
| 2 | Nominal Capacity 标称容量(1.0C) | \geq Nominal Capacity*95% \geq 标称容量*95% | The capacity shall be measured when the cell is discharged to a cut-off voltage of 2.5V at a discharge current of 1.0C under the condition of $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ after standard charge 电池按规定充电结束后；在 $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 的条件下以 1.0C 电流放电到 终止电压 2.5V 时的测量值。 |
| 3 | High Rate Discharge Capacity 高倍率放电容量(2C) | Not less than 90% of nominal capacity 不低于 标称容量的 90% | The capacity shall be measured when the cell is discharged to a cut-off voltage of 2.5V at a discharge current of 2C after standard charge. 电池按标准充电方式结束后，2C 电流放电到终止电压 2.5V 时的测量值。 |
| 4 | Discharge Capacity at -20°C -20°C 放电容量(0.2C): | Not less than 80% of nominal capacity 不低于标称容量的 80% | The capacity shall be measured when the cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C after standing under an ambient temperature of $-20\pm 2^{\circ}\text{C}$ for 4hours at the end of standard charge. 电池按标准充电方式结束后，在环境温度为 $-20\pm 2^{\circ}\text{C}$ 条件下保持 4 小时；以 0.2C 电流放电到终电压 2.5V 时的测量值。 |
| 5 | Discharge Capacity at 55°C 55°C 放电容量 (0.2C) | Not less than 95% of nominal capacity 不低于标称容量的 95% | The capacity shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C after standing under an ambient temperature of $55\pm 2^{\circ}\text{C}$ for 5 hours at the end of standard charge. 电池按标准充电方式结束后，在 $55\pm 2^{\circ}\text{C}$ 中保持 5h；以 0.2C 电流 放电到终止电压 2.5V 时测容量。 |

| | | | |
|---|---|---|--|
| 6 | Storage Characteristics at 25°C 25°C 储存特性 | Capacity retention $\geq 95\%$ Capacity recovery $\geq 97\%$ 容量保持率 $\geq 95\%$ 容量恢复率 $\geq 97\%$ | The capacity retention shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C after standing for 28 days at 25±2°C at the end of standard charge. The capacity recovery shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C at the end of standard charge after measuring the capacity retention. 容量保持量应在电池按标准充电方式结束后, 在环境温度为 25±2°C 条件下; 将电池开路搁置 28 天; 再以 0.2C 电流进行放电到终止电压 2.5V 时测量; 而容量恢复量在测量容量保持量后按标准充电方式结束后; 以 0.2C 电流放电到终止电压 2.5V 时测量。 |
| 7 | Storage Characteristics at 45°C 45°C 储存特性 | Capacity retention $\geq 85\%$ Recovery capacity $\geq 90\%$ 容量保持率 $\geq 85\%$ 容量恢复率 $\geq 90\%$ | The capacity retention shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C after standing for 28 days at 45±2°C at the end of standard charge. The capacity recovery shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C at the end of standard charge after measuring the capacity retention. 容量保持量应在电池按标准充电方式结束后, 在环境温度为 45±2°C 条件下; 将电池开路搁置 28 天; 再以 0.2C 电流进行放电到终止电压 2.5V 时测量; 而容量恢复量是在测量容量保持量后按标准充电方式结束后; 以 0.2C 电流放电到终止电压 2.5V 时测量。 |
| 8 | Storage Characteristics at 55°C 55°C 储存特性 | Capacity retention $\geq 85\%$ Capacity recovery $\geq 90\%$ 容量保持率 $\geq 85\%$ 容量恢复率 $\geq 90\%$ | The capacity retention shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C after standing for 7 days at 55±2°C at the end of standard charge. The capacity recovery shall be measured when the Cell is discharged to a cut-off voltage of 2.5V at a discharge current of 0.2C at the end of standard charge after measuring the capacity retention. 容量保持量应在电池按标准充电方式结束后, 在环境温度为 55±2°C 条件下; 将电池开路搁置 7 天; 再以 0.2C 电流进行放电到终止电压 2.5V 时测量; 而容量恢复量是在测量容量保持量后按标准充电方式结束后; 以 0.2C 电流放电到终止电压 2.5V 时测量。 |

| | | | |
|---|-----------------|---|--|
| 9 | Cycle Life 循环寿命 | Cycle number ≥ 300 (80% nominal capacity) 循环圈数 ≥ 300 (80%标称容量) | The cycle life test should be set at $25 \pm 2^\circ\text{C}$ according to the following steps: 循环寿命测试应在 $25 \pm 2^\circ\text{C}$ 条件下按以下工步设置: Step 1 Standard charge; Step 2 Standing for 30 minutes; Step 3 Discharge the cell at 0.5C to 2.5V; Step 4 Standing for 30 minutes; Step 5 Repeat Step 1、Step 2、Step 3 and Step 4. 第一步 标准充电; 第二步 静置 30 分钟; 第三步 以 0.5C 电流放电到 2.5V; 第四步 静置 30 分钟; 第五步 重复第一步、第二步、第三步和第四步。 |
| | | Cycle number ≥ 500 (80% nominal capacity) 循环圈数 ≥ 500 (80%标称容量) | The cycle life test should be set at $25 \pm 2^\circ\text{C}$ according to the following steps: 循环寿命测试应在 $25 \pm 2^\circ\text{C}$ 条件下按以下工步设置: Step 1 Standard charge 4.2V; Step 2 Standing for 30 minutes; Step 3 Discharge the cell at 0.5C to 2.75V; Step 4 Standing for 30 minutes; Step 5 Repeat Step 1、Step 2、Step 3 and Step 4. 第一步 标准充电 4.2V; 第二步 静置 30 分钟; 第三步 以 0.5C 电流放电到 2.75V; 第四步 静置 30 分钟; 第五步 重复第一步、第二步、第三步和第四步。 |

5.2 安全性能 Safety performance

| 序号 NO. | 项目 Items | 标准 Criteria | 测试方法 Test Methods |
|--------|--------------------------------|--|--|
| 1 | Over Charge 过充电 | No explosion No fire 不爆炸, 不起火 | After standard charge, the cell shall be charged at the current of 1C, till the voltage is 4.73V or the charging up to 115% SOC, observe 1h. 电池按标准充电方式结束后, 电池以 1C 电流充电, 直到电压达到 4.73V 或充电到 115% SOC, 观察 1h。 |
| 2 | External Short Circuit 外部短路 | No explosion No fire 不爆炸, 不起火 | After standard charge, the cell shall be shorted for 10min by a wire (internal resistance less than 5mΩ), observed for 1h. 电池按标准充电方式结束后, 用内阻小于 5mΩ 的线路短路电池 10min, 观察 1h。 |
| 3 | Over Discharge 过放电 | No explosion No fire No leakage 不爆炸, 不起火, 不漏液 | After standard charge, the cell shall be discharged 90min at 1C, observed for 1h. 电池按标准充电方式结束后, 以 1C 放电 90min, 观察 1h。 |
| 4 | Heating 加热 | No explosion, no fire 不爆炸, 不起火 | After standard charge, the cell shall be heated up to 130±2°C at a rate of 5±2°C/min and kept at this temperature for 30min, observed for 1h. 电池按标准充电方式结束后, 以 5±2°C/min 升温至 130±2°C, 此温度下保持 30min, 观察 1h。 |
| 5 | Crush Test 挤压测试 | No explosion No fire 不爆炸, 不起火 | After standard charge, the cell shall be extruded with semi-cylinder (R 75mm) perpendicular to the direction of the plate, at a extrusion rate of (5 ± 1) mm/s until the voltage reaches 0V or the deformation degree reaches 30% or the extrusion pressure reaches 100kN, observed for 1h. 电池按标准充电方式结束后, 用 R75mm 半圆柱体垂直于极板方向挤压电池, 挤压速度 (5±1) mm/s, 直至电压达到 0V 或形变量达 30% 或挤压力达 100kN 后停止, 观察 1h。 |
| 6 | Seawater Immersion 海水浸泡 | No explosion No fire 不爆炸, 不起火 | After standard charge, the cell shall be immersed in 3.5% NaCl solution (mass fraction, simulating the composition of seawater at room temperature) for 2h, and should be completely submerged in the water. 电池按标准充电方式结束后, 将电池浸入 3.5% NaCl 溶液 (质量分数, 模拟常温下的海水成分) 中 2h, 水深应完全没过电池。 |
| 7 | Free Falling(drop) 自由跌落测试 | No explosion No fire No leakage 不爆炸, 不起火, 不漏液 | After standard charge, the cell shall be dropped freely from the height of 1.5m to cement board with its positive and negative terminals pointing downward, observed for 1h. 标准充电后, 正负端子向下, 电池从 1.5m 高度自由跌落到水泥板面, 观察 1h。 |

| 8 | Low Pressure 低气压 | No explosion, no fire, no leakage 不爆炸、不起火、不漏液 | After standard charge, the cell shall be put into a low-pressure box, whose pressure is adjusted to 11.6 kPa and the temperature is kept at room temperature, standing for 6h, observed for 1h. 标准充电后,将电池放入低气压箱中,调节试验箱气压为 11.6 kPa, 温度为室温,静置 6h,观察 1h。 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|----------------------------------|--|---|------|-------------|-------------|--------------|----|---|---|---|-----|----|----|-------|-----|----|-----|---|----|----|-----|-------|----|----|-----|-----|----|-----|-----|---|----|----|-----|-----|
| 9 | Temperature Cycling Test 温度循环 | No explosion No fire 不爆炸,不起火 | After standard charge, the cell shall be put into a temperature box whose temperature is adjusted according to the following table and fig.2., observed for 1h after 5 cycles. 电芯按照标准充电方式结束后,放入温度箱中,温度箱温度按下表和图 2 进行调节,循环 5 次后,观察 1h。 Temperature and time for one cycle of the temperature Test. <table border="1" data-bbox="675 902 1471 1283"> <thead> <tr> <th>温度°C</th> <th>时间增量 min</th> <th>累计时间 min</th> <th>温度变化率 °C/min</th> </tr> </thead> <tbody> <tr><td>25</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>-40</td><td>60</td><td>60</td><td>13/12</td></tr> <tr><td>-40</td><td>86</td><td>150</td><td>0</td></tr> <tr><td>25</td><td>60</td><td>210</td><td>13/12</td></tr> <tr><td>85</td><td>86</td><td>300</td><td>2/3</td></tr> <tr><td>85</td><td>110</td><td>410</td><td>0</td></tr> <tr><td>25</td><td>70</td><td>480</td><td>6/7</td></tr> </tbody> </table> <p>温度实验一个循环的温度和时间</p>  | 温度°C | 时间增量 min | 累计时间 min | 温度变化率 °C/min | 25 | 0 | 0 | 0 | -40 | 60 | 60 | 13/12 | -40 | 86 | 150 | 0 | 25 | 60 | 210 | 13/12 | 85 | 86 | 300 | 2/3 | 85 | 110 | 410 | 0 | 25 | 70 | 480 | 6/7 |
| 温度°C | 时间增量 min | 累计时间 min | 温度变化率 °C/min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -40 | 60 | 60 | 13/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -40 | 86 | 150 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 60 | 210 | 13/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 86 | 300 | 2/3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 110 | 410 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 70 | 480 | 6/7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6. 产品测试要求及依据标准 Product Testing Requirements and Standards

The test cells shall not exceed one month after shipment from our factory and the cells shall have not been through over five charge/discharge cycles before tests , unless otherwise specified.

| | |
|---|---|
|  | <p style="text-align: center;">南屋科技（广州）有限公司 Nanwu Technology (Guangzhou) Co., Ltd</p> |
| <p style="text-align: center;">File No. NNS11588187 Version 1.0</p> | <p style="text-align: center;">NNS11588187 45Ah 电池产品规格书 Lithium-ion NNS11588187 45Ah Cell Product Specification</p> |

测试电池必须是本公司出厂时间不超过一个月，且电池未进行过五次以上充放电循环，除非另有规定。

6.1 测试环境要求 Requirements of Test Environment

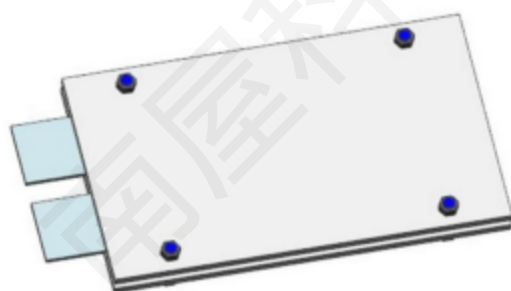
All the tests in this specification shall be conducted under standard atmospheric condition under an ambient temperature of $25 \pm 2^{\circ}\text{C}$, a humidity of 15% to 86% and a atmospheric pressure of 86kPa to 106kPa.

本规格书中各项试验应在标准大气条件下进行：温度： $25 \pm 2^{\circ}\text{C}$ ；相对湿度：15%~86%；大气压力：86kPa~ 106kPa。

6.2 测试夹具力要求 Requirements of Testing Clamping force

All the tests shall be conducted with splints. (Unless otherwise specified) The clamping force shall be $50 \pm 5\text{Kgf/pcs}$.

所有测试均需在带夹板状态下进行。（除非特别说明）夹具力： $50 \pm 5\text{Kgf/pcs}$ 。



6.3 测试依据标准 Standards for Testing

Company standards, UL, CE, GB/T 36672 2018, GB/T31484-2015, GB/T31490-2015 and GB 38031-2020 relevant standard.

公司企业标准、UL、CE、GB/T 36672 2018, GB/T31484-2015、GB/T31490-2015、GB 38031-2020 相关标准。

6.4 测试设备要求 Requirements of Test instruments

6.4.1 The accuracy of measuring the voltage and current of the multimeter should not be lower than 0.5; the internal resistance when measuring voltage should not be less than $10\text{k}\Omega / \text{v}$.

万用表测量电压及电流的准确度应不低于 0.5 级；测电压时内阻不应小于 $10\text{k}\Omega / \text{v}$ 。

6.4.2 The measuring principle of internal resistance tester should be AC impedance method. (1kHz LCR

meter).

内阻测试仪测量原理应为交流阻抗法(1kHz LCR)。

6.4.3 The accuracy of the mass measuring instrument should meet $\pm 0.1\%$; the accuracy of the timing device should meet $\pm 0.1\%$; the accuracy of the instrument for temperature measurement should meet $\pm 0.5^{\circ}\text{C}$; the accuracy of the dimension measuring instrument should meet $\pm 0.1\%$.

质量测量装置精度应满足 $\pm 0.1\%$ ；计时装置精度应满足 $\pm 0.1\%$ ；温度测量的仪表准确度应满足 $\pm 0.5^{\circ}\text{C}$ ；尺寸测量仪器精度应满足 $\pm 0.1\%$ 。

6.5 测试条件 Test Conditions

6.5.1 Standard charge: 0.2C constant current (CC) charge to 4.3V, then 4.3V constant voltage charge to a current less than or equal to 0.05C.

标准充电：0.2C 恒流充电至 4.3V；然后 4.3V 恒压充电至电流小于等于 0.05C。

6.5.2 Standard discharge: 0.2C constant current (CC) discharge to discharge ending voltage.

标准放电：0.2C 恒流放电至放电终止电压。

7. 运输 Shipment

Cells should be shipped at about 50% SOC.

电池应该在 50%左右的荷电状态下运输。

8. 外观检查 Visual Inspection

不允许有任何影响电池性能的外观缺陷，如裂纹、裂缝、泄漏等。

There shall be no such defects as scratch, flaw, crack, and leakage, which may adversely affect the commercial value of the cell.

8. 包装 Packaging

8.1 电池的包装应符合防潮防震的要求；

The cell shall be packed in accordance with the requirements of moisture-proof and shock-proof ;

8.2 包装箱内应装入随同产品提供的文件；

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| File No. NNS11588187 Version 1.0 | NNS11588187 45Ah 电池产品规格书 Lithium-ion NNS11588187 45Ah Cell Product Specification |

The packing case shall contain the documents provided with the products:

- 装箱单（指一批多箱包装时） Packing list (refers to a batch of multiple boxes);
- 产品合格证 Product certificate;
- 产品检验报告 Product inspection report.

9. 标识 Identification

9.1 单体电池产品上应有下列标识：

Cell product shall have the following marks:

- 额定容量 Rated capacity
- 极性符号+、- Polar symbol: +/-
- 产品条码（信息包含产品型号、批号、生产日期信息）

Product barcode (information including product model, batch number and date of production)

9.2 包装箱外壁应有下列标志：

Each packing case shall be marked with:

- 产品名称（锂离子电池）、产品型号、产品批号、产品等级、数量、物料编码

Product name (solid lithium ion cell), product model, product batch number, product grade, quantity, material code

- 标明防潮、不准倒置、轻放等标志 Moisture-proof, no upside-down and other signs
- 制造商或商标 Manufacturer or trademark

10. 存储及其他事项 Storage and Others

10.1 长期储存 Long Time Storage:

长期储存的电池（超过3个月）须置于干燥、凉爽处，每6个月对电池进行一次充放电，储存电压为3.5V，且充放电环境要求如7所述。

If the cell is to be stored for a long time (over 3 months), the cell should be stored in dry and cool place. The cell should be charged and discharged every six month. The cell's storage voltage should be 3.5V and the cell is to be stored at the condition as NO.7.

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10.2 其他事项 Others:

任何本规格书中未提及的事项，须经双方协商确定。

Any matters which have not been covered in this specification should be conferred between the customer and Nanwu Technology (Guangzhou) Co., Ltd.

11. 保质期及产品责任 Warranty Period and Product Liability

11.1 保质期 Warranty

保质期是从客户验收开始起 12 个月。

Warranty period of this product is 12 months from the production date.

11.2 产品责任 Product Liability

南屋科技（广州）有限公司对因没有按本规格书规定操作而导致的意外不负责任，当本规格书有一些变动时，本公司会通知购买方。

Nanwu Technology (Guangzhou) Co., Ltd is not responsible for the troubles caused by mishandling of the cell which is clearly against the instructions in this specification. Nanwu Technology (Guangzhou) Co., Ltd will notify our customers if there are any changes of the product specification.

12. 文件有效期 Validity Period of Documents

本文件自发布之日起至下次修正日止。

The validaiton for this document is from the issue date to the date of the next revision.

13. 保密 Confidentiality

本产品规格书在没有得到南屋科技（广州）有限公司的许可时，不能向第三方泄露，禁止复印或转载。

This product specification shall not be disclosed to any third party without the permission of Nanwu Technology (Guangzhou) Co., Ltd; nor shall it be copied or reproduced.

14. 警告及注意事项 Warnings and Cautions

14.1 不要将电池投入火中或加热； Do not put the cell into the fire or a heater;

14.2 不要将电池分解拆散； Do not dismantle the cell;

14.3 严禁将电池浸入海水或水中，保存不用时，应放置于阴凉干燥的环境中；

Do not immerse the cell in water or seawater, keep the cell in a cool dry environment if it stands by;

14.4 禁止将电池放在热源旁，如火、加热器等；

Do not use or leave the cell near sources of heat such as a fire or heater;

14.5 充电时请选用锂离子电池专用充电器；

Use the charger specifically for lithium-ion cell when recharging;

14.6 严禁颠倒正负极使用电池； Do not reverse the position and negative terminals;

14.7 严禁将电池直接插入电源插座； Do not connect the cell directly to an electrical outlet;

14.8 禁止用金属直接连接电池正负极短路；

Do not short-circuit the cell by directly connecting the positive and negative terminals with metal objects;

14.9 禁止将电池与金属（如发夹、项链等）一起运输或贮存；

Do not transport or store the cell together with metal objects such as hairpins, necklaces, etc;

14.10 禁止敲击或抛掷、踩踏电池等；

Do not strike, trample or throw the cell, etc;

14.11 禁止直接焊接电池和用钉子或其它利器刺穿电池；

Do not directly solder the cell and pierce the cell with a nail or other sharp objects;

14.12 禁止在高温下（炙热的阳光下或很热的汽车中）使用或放置电池，否则可能会引起电池过热、起火或功能失效、寿命减短；

Do not use or leave the cell at high temperature (for example, under the hot sunlight or in a hot vehicle).

Otherwise, it can overheat, catch fire, or suffer from performance and life degradation;

14.13 禁止在强静电和强磁场的地方使用，否则易破坏电池安全保护装置，带来不安全的隐患；

Do not use the cell in a location with strong electrostatic field or magnetic field. Otherwise, the safety protective device may be damaged, causing safety hazard;

14.14 如果电池发生泄露，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛，并立即送医治疗； If the cell leaks and the electrolyte gets into the eyes, do not rub the eyes, instead, rinse the eyes with clean

water, and immediately seek medical attention so as not to cause more injury to your eyes;

14.15 如果电池发出异味、发热、变色、变形或使用、贮存、充电过程中出现任何异常，立即将电池从装置或充电器中移离并停用；

If the cell gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or cell charger and stop using it;

14.16 废弃之电池应用绝缘纸包住电极以防起火、爆炸；

Be aware that abandoned batteries may cause fire or explosion, tape the cell terminals to insulate them;

14.17 如果电池极柱弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效。

If the cell terminals are stained, clean the terminals with a dry cloth before use. Otherwise performance degradation may be caused due to the poor connection.