# Product specification for 3.2V/66Ah Lithium-ion Rechargeable Cell

**Cell Type: SP-LFP66AhA**

**Shenzhen Sinopoly battery Co,, Ltd.**

# Contents

## 1. Scope

This product specification covers the type, size, structure, electrochemistry performance, environmental characteristics, warning and caution of the SP-LFP66AhA single cell. This PS only applies to the cells that supplied by Shenzhen Sinopoly battery Co,, Ltd. .

## 2. Cell type and explanation

| SP | LFP | - | 66Ah | A |
|---|---|---|---|---|
| i | ii iii | | iv | v |

i： “SP” represents manufactory（Shenzhen Sinopoly battery Co., Ltd.）
ii： “LF” represents the cathode material type of the cell is $LiFePO_4$
iii： “P” represents the structure of the single cell is prismatic
iv： “66Ah” represents the normal capacity of the single cell is 66Ah
v： “A” represents the cathode and anode terminal in the same direction

## 3. Definitions

### 3.1 Normal Capacity

Normal Capacity is 66Ah, cells shall be tested at 20±3℃, 65±20%RH, it means the capacity value of being discharged by 3-hours ratio to the cut-off voltage 2.5V, which is signed as $C_3$, the unit is Ah.

### 3.2 Standard charging method

The cell is to be conditioned at 20±3℃, 65±20%RH, charging the battery with $1/3C_3A$(22A) constant current to 3.65V, then 3.65V constant voltage charge with current taper to $0.02C_3A$(1.3A).

### 3.3 Standard discharging method

Full charged cell is to be conditioned at 20±3℃, 65±20%RH, discharging the cell with $1/3C_3A$(22A) constant current to 2.5V.

### 3.4 Quick charging method

The Cell is to be conditioned at 20±3℃, 65±20%RH, charging the Cell with $2.0C_3A$(132A) constant current to 3.65V, then 3.65V constant voltage charge with current taper to $0.02C_3A$(1.3A).

### 3.5 Quick discharging method

Full charged cell is to be conditioned at 20±3℃, 65±20%RH, discharging the cell with $3.0C_3A$(198A) constant current to 2.5V.

## 4. Cell structure

The cell consists of the cathode electrode, anode electrode, separator, electrolyte, foil, plastic product, etc.

## 5. Cell specification

| Item | Specification |
|---|---|
| Weight | 2.1±0.1 Kg |

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| Cell dimension | Thickness ： 42.5 ±0.5 mm<br>Width ： 269.0 ±1.5mm<br>Length ： 110.0 ±1mm |
| Normal capacity | 66Ah@1/3$C_3$A(22A) |
| Normal voltage | 3.2 V |
| Charging cut-off voltage | 3.65±0.05 V |
| Discharging cut-off voltage | 2.5±0.05 V |
| Standard charging current | 1/3$C_3$A(22A) |
| Standard discharging current | 1/3$C_3$A(22A) |
| Max continuous charging current | 2.0$C_3$A(132A) |
| Max continuous discharging current | 3.0$C_3$A(198A) |
| Max plus discharging current | 10.0$C_3$A(660.0A)＜10s |
| Internal resistance | ≤2.0mΩ(AC Impedance, 1 000 Hz) |
| Shipment voltage | 3.2～3.4V |
| Appearance | Without break, scratch, distortion, pocking, leakage and so on. |

## 6. Technical request

### 6.1 Cell Working Temperature

Charging temperature: 0°C ~ 70°C

Discharging temperature: -20°C ~ 70°C

### 6.2 Cell Test Conditions

Unless otherwise specified, all test should be under the following conditions:

Temperature: 20±3℃

Relative Humidity: 65±20%RH

Atmospheric pressure: 86kPa~106kpa

### 6.3 Requirement of The Testing Equipment

Voltage meter：Internal resistance of the voltage tester is ≥ 10 KΩ/V.

Temperature meter： The precision is ≥ 0.5℃.

## 6.4 Electrochemistry Performance

| No. | Items | | Criterion | Testing method | Remark |
|---|---|---|---|---|---|
| 1 | Discharging performance at high and low temperature | -20°C | Time of discharge at -20 ℃ should not less than 126 minutes. | • Cell shall be charged following the standard charging method. And then standby for 20 hours at -20℃ followed by a discharge at 1/3$C_3$A(22A) to 2.5V at this temperature.<br>• Then cell shall allowed to rise to room temperature for one hour, followed by standard charging. and then standby for 5 hours at 55℃ followed by a discharge at 1/3$C_3$A(22A) to 2.5V at this temperature.<br>• The discharge times and capacity at different temperatures shall be recorded. | |
| | | 55°C | Time of discharge at 55℃ should not less than 171 minutes. | | |
| 2 | RT Cycle | | After 2000 cycles, the residual capacity/ original discharge capacity≥80%. | The cell is tested at 20±3℃, 65±20% relative humidity and 86kPa~106kpa. First fully charge the cell with standard charging method, then discharge the cell with standard discharging method, the time interval between charging and discharging should not less than 30mins, then repeat the steps mentioned above. | |
| 3 | RT Charge retention | | Standby at RT for 28days, discharge capacity should not less than 95% of the origin discharged capacity. | The capacity of the cell is tested by fully charged and discharged with standard method. Charging the cell with standard charging method, then stored with open- circuit at RT for 28days, discharged the cell with standard discharging method. | |
| 4 | RT Charge recovery | | Discharge capacity should not less than 97% of the origin discharge capacity. | The cell which had been through charge retention test is to be fully charged with standard charging method, then discharge the cell standard discharging method. | |
| 5 | 55℃ Charge retention | | Standby at 55 ℃ for 7days, discharge capacity should not less than 90% of the origin discharged capacity. | The capacity of the cell is tested by fully charged and discharged with standard method. Charging the cell with standard charging method, then stored with open- circuit at 55 ℃ for 7days, discharged the cell with standard discharging method. | |
| 6 | 55℃ Charge recovery | | Discharge capacity should not less than 95% | The cell which had been through charge retention test is to be fully charged with standard charging method, then discharge the cell standard discharging method. | |

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| | | of the origin discharge capacity. | | |
| 7 | Rate performance | The discharge capacity at 3.0$C_3$A(198A) should be ≥90%, the discharge time should not less than 27mintues. | The capacity of the cell is tested by fully charged and discharged with standard method. Charging the cell with standard charging method, then discharge the cell with 3.0$C_3$A(198A) constant current to 2.5V. | |

### 6.5 Environmental Characteristics

| NO. | Item | Criterion | Testing method |
|---|---|---|---|
| 1 | Vibration | No leakage, no fire and no explosion. | After standard fully charge, standby the cell for 4hours,and measure the voltage and impedance ,then the cell is to be subjected to simple motion with an amplitude of 1.2mm, the frequency is 16.7hertz, and return in 90min. |
| 2 | Temperature impact test | No leakage, no fire and no explosion. | The cell is fully charged with standard charging method, and then it is to be stored for four hour at a test temperature equal to -20 °C, followed by a storage for four hour at a test temperature equal to 75°C, the maximum time interval between test temperature extremes is 30s, this procedure is to be repeated for 4 times, after which all test cells are to be stored for 6 hours at ambient temperature (20±3℃). |
| 3 | Low pressure test | The samples shall not explode or catch fire, or leak. | The fully charged cell is to be stored for 6 hours at an absolute pressure of 11.6Kpa and a temperature of 20±3°C. |
| 4 | 130°C storage | The samples shall not catch fire and explode. | The fully charged cell is to be heated in gravity convection or circulating air oven, the temperature of the oven is to be raised at a rate of 5±2℃ per minute to a temperature of 130±2℃ and remain for 10 minutes at that temperature before the test is discontinued. |
| 5 | Constant temperature and constant humidity test | The samples shall not leak, smoke, explode. Retention capacity≥80%. | The cell is fully charged with standard charging method, the cell is to be stored for 24 hours in an oven with a constant temperature of 40±2℃ and a relative humidity of 90~95%, after testing the cell should be stored for 2hours at a temperature of 20±3℃, 65±20% relative humidity and a pressure of 86kPa~106kpa. |

### 6.6 Safety Characteristics

| NO. | Item | Criterion | Testing method |
|---|---|---|---|
| 1 | Free fall test | The samples shall not explode, catch fire or | The cell is fully charged with standard charging method, standby for 1hour and then it is submitted to free fall at a height of 1.5m down to |

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| | | leak. | one solid board. It should be fallen for 1 times on each direction. |
| 2 | Over-charge | The samples shall not explode or catch fire. | First discharge the cell with standard discharging method, then the cell is to be charged with 1.0$C_3$A(66.0A) constant current to 5.0V. |
| 3 | Over-discharge | The samples shall not explode, catch fire or leak. | The cell is discharged to 2.5V with standard discharging method, then continue discharging the cell with 1/3$C_3$A(22A) current to 0V. |
| 4 | Short-circuit test | The samples shall not explode, catch fire, and the cell temperature should not exceed 150 ℃. | The cell is fully charged with standard charging method and rest at room temperature for 1hour, the cell is to be short-circuit by connecting the positive and negative terminals of the cell with wire having a resistance load of less than 5mOhm for 10 minutes. |
| 5 | Nail test | The samples shall not explode or catch fire, the cell temperature should not exceed 150 ℃, but deformation is allowed. | The cell is fully charged with standard charging method, then it is to be penetrated vertically through the center of the largest side of the cell with a speed of 10~40mm/s and left for over 30s, the diameter of the nail is 3-8mm. |
| 6 | Crush test | The samples shall not explode or catch fire. | The cell is fully charged with standard charging method, then it is to be crushed between two flat surfaces. The crushing is to be continued until a pressure reading of 2500 psig (17.2 MPa) is reached on the hydraulic ram, applied force of 3000 pounds (13 kN).Once the maximum pressure has been obtained it is to be released. |

## 7. Warning and cautions in handing the Lithium-ion battery

**! Danger warning** (it should be described in manual or instruction for users)

To prevent the possibility of the battery from leaking, heating, explosion, please observe the following precautions:

- Don't immerse the battery into water.
- Do not use and leave the battery near a heat source such as fire or heater.
- When charging, use a battery charger specifically for that purpose.
- Don't reverse the positive and negative terminals.
- Don't connect the battery to an electrical outlet directly.
- Don't discard the battery in fire or heater.
- Don't connect the positive and negative terminal directly with metal objects.
- Don't transport and store the battery together with metal objects such as necklaces, hairpins.
- Don't strike, throw or trample the battery.
- Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.

**!CAUTION**

- Don't use or leave the battery at very high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions).

- Don't use it in a location where there is the possibility of a strong electrostatic discharge or strong magnetic field. This may cause the safety devices may be damaged.
- If the battery leaks and the electrolyte get into your eyes, don't wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention. Otherwise, eyes injury can result.
- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during usage, recharging or storage, immediately remove it from the device or battery charger and stop using it.
- In case the battery terminals get dirty, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the device.

## 8. Free-responsibility declaration

Before using the battery, you should read the specifications, usage instruction and some attentions carefully to learn its application method and areas. If the phenominon such as error using method or wrong circuit connection, or input power data, working index are inconsisted with the specifications happen and cause damage to production, circuit and its accesaries, we are not responsible for it.

Any matters this specification does not cover should be covered by Sinopoly the customer.

The final explanation right belongs to Shenzhen Sinopoly battery Co,, Ltd..

## 9. Contact Information

If you have any question regarding the cell, please contact the following address:

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