Prismatic sodium-ion battery

型号： NaFP71/173/204CY-210

版本： A1

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Contents

1. Scope of application

- This specification describes the performance indicators of sodium-ion battery model NaFP71/173/204CY-210 provided by SZ ZHONGHUAJIA TECH LTD
- This product uses layered oxide cathode material and biomass precursor hard carbon system, and has excellent low temperature, rate, and long cycle characteristics.
- This product mainly refers to the following standards for evaluation of performance indicators:

UN 38.3

QB/T 2502-2000"General Specifications for Lithium-Ion Batteries"

GB/T 31484/5/6"International Energy Storage Battery Certification Standards"

GB/T36276-2018"Lithium-ion Batteries for Electric Power Storage"

JBT 11137-2011"General Requirements for Lithium-Ion Battery Assemblies"

2. Noun definition

2.1 Battery category: prismatic sodium-ion battery

2.2 Battery model： NaFP71/173/204CY-210

Na-negative pole is a system embedded with sodium ions. F-positive pole is a system dominated by iron. P-battery shape 71/173/204-battery size CY-battery manufacturer -separator 210-nominal capacity, unit: Ah

2.3 Standard charging method:

In an environment of 25.0±3.0°C, charge with a constant current of 0.50C to a single cell voltage of 3.95V, then switch to constant voltage charging of 3.95V, and stop charging when the current equals 0.05C.

2.4 Standard discharge method:

In an environment of 25.0±3.0℃, discharge at a constant current of 0.50C until the single cell voltage is 1.50V.

2.5 Nominal capacity:

Nominal capacity Cap =210Ah, which refers to the battery capacity expressed in Cap according to the standard charge and discharge system 2.3 and 2.4 in an environment of 25.0±3.0℃, and the unit is ampere hours (Ah).

2.6 Test temperature and humidity:

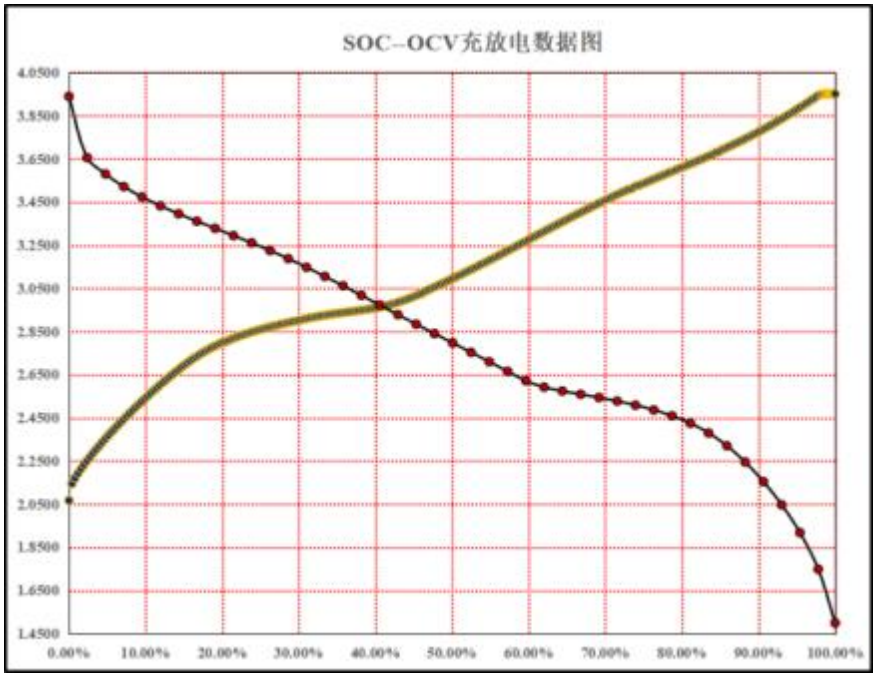
If there are no special requirements, the product testing conditions in this specification are temperature 25°C±3°C; humidity: 65% ±20%RH.

3. Battery parameters

3.1 General parameters

Item	Specification
Nominal capacity	210.00A@0.50C in 25.0±3.0℃ environment
Typical capacity	215.00A@0.50C in 25.0±3.0℃ environment
Nominal voltage	≈3.10V
Upper limit voltage	3.95 ±0.05 V
Lower limit voltage	1.50 ±0.05 V Can be discharged to 0V without affecting battery performance
DC internal resistance	≤0.50mΩ
Battery size	Length: 173.60±0.50mm Thickness: 71.25±0.50mm Height: 203.70±0.50mm
Energy Density	≥140.00Wh/Kg
Battery weight	4.70±0.50Kg
Storage temperature (state of charge at shipment)	-20～60℃ Ventilated and protected from light
Temperature and charging performance	≤-20℃: When used, the performance of sodium battery is affected -20~0℃ :≤0.20C 0~45℃ :≤0.50C ≥ 45℃: When used, the performance of sodium battery is affected
Temperature and discharge performance	≤-40℃: When used, the performance of sodium battery is affected -40~0℃ :≤0.50C 0~45℃ :≤0.50C 45~60℃:≤0.20C ≥60℃: When used, the performance of sodium battery is affected
Instantaneous maximum discharge current	Instantaneous current: 3.00C Duration: ≤30s
Maximum continuous discharge current	Continuous current: 1.00C Discharge temperature rise ≤15℃

3.2 Charge and discharge data chart



3.3 Loop parameters

3.3.1 Test cycles according to the rules of 2.3 and 2.4. When actual capacity/nominal capacity ≈ 70%, the number of cycles is ≥ 4000 times.

3.4 Low temperature performance

3.4.1 -40℃ 0.5CDischarge capacity/ 25℃ 0.5C Discharge capacity≥65.00%;

3.4.2 -30℃ 0.5C Discharge capacity/ 25℃ 0.5C Discharge capacity≥80.00%;

3.4.3 -20℃ 0.5C Discharge capacity/ 25℃ 0.5C Discharge capacity≥90.00%;

3.4.4 -10℃ 0.5C Discharge capacity/ 25℃ 0.5C Discharge capacity≥97.00%。

3.5 High temperature performance

3.5.1 60℃ 0.5C Discharge capacity/ 25℃ 0.5C Discharge capacity≥95.00%;

3.5.2 45℃ 0.5C Discharge capacity/ 25℃ 0.5C Discharge capacity≥100.00%。

3.6 Safety performance

NO	Items	Performance standards	Test conditions and methods
1	Vibration test	No fire, no explosion, no leakage	Reference: UL1642-16 After standard charging, the battery should be subjected to vibration with an amplitude of 0.8mm, a vibration frequency changing at a rate of 1Hz/min in the range of 10-55HZ, and vibrating for 60min.
2	Heating test	No fire, no explosion	Reference: GB 38031 8.1.5 After standard charging, the oven temperature is increased to 130℃ ± 2℃ at 5 ± 2℃/min, kept at this temperature for 30min, and observed for 1 hour.
3	Short circuit test	No fire, no explosion	Reference: GB 38031 8.1.4 After standard charging, at 25°C ±3°C, externally short -circuit the positive and negative terminals of the battery for 10 minutes (external circuit resistance <5mΩ) and observe for 1 hour.
4	Overcharge test	No fire, no explosion	Reference: GB 38031 8.1.3 After standard charging, at 25°C ±3°C, charge the battery to 5.0V or 120% SOC at a constant current of 1C, then stop charging and observe for 1 hour.
5	Over discharge test	No fire, no explosion	Reference: GB 38031 8.1.2 After standard charging, the battery is discharged at 1C current at 25°C ±3°C until the discharge time reaches 90min and observed for 1 hour.
6	Heavy impact	No fire, no explosion	Reference: UL1642-14 After standard charging, place a round rod with a diameter of 15.8mm in the center of the battery, and drop a 9.1Kg weight vertically from a height of 610mm to the center of the battery.
7	Drop test	No fire, no explosion	Reference: GB/T 31485 6.2.5 After standard charging, freely drop the positive and negative terminals of the battery sample downward from a height of 1.0m to the cement floor and observe for 1 hour.
8	squeeze test	No fire, no explosion	Reference: GB 38031 8.1.7 After standard charging, the battery is placed between the two extrusion surfaces of the extrusion equipment. The cylindrical battery core axis is parallel to the extrusion plane. At an extrusion speed of ≤2mm/s, gradually increase the pressure until the deformation reaches 15% or the extrusion The pressure reaches 100kN or 1000 times the weight of the battery, maintain the pressure for 10 minutes, and observe for 1 hour.
9	Low pressure test	No fire, no explosion	Reference: UL1642-19 After standard charging, the battery is stored for 6 hours at an absolute pressure of 11.6Kpa and a temperature of 20±5°C.

4. Instructions for use

4.1 Temperature gradient charging solution

	SOC	Temperature gradient						
		-20°C ~-10°C	-10°C ~0°C	0°C ~ 10°C	10°C ~ 25°C	25 °C~ 45 °C	45°C ~ 60°C	60 °C ~80 °C
Max charging rate	100.00%	/	/	0.05C	0.05C	0.05C	/	/
	90.00%	0.05C	0.10C	0.50C	0.50C	0.50C	/	/
	80.00%	0.05C	0.20C	0.50C	0.50C	0.50C	/	/
	70.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	60.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	50.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	40.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	30.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	20.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	10.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/
	0.00%	0.10C	0.20C	0.50C	0.50C	0.50C	/	/

4.2 Battery storage

The storage state of charge of sodium-ion batteries needs to be controlled at 20% to 30% SOC, and the battery must be charged and discharged every 6 months.

4.3 Battery transport

The state of charge of the battery during transportation is 20% to 30% SOC. The battery is packed into boxes for transportation. During transportation, it should be protected from severe vibration, impact or extrusion, protected from sunlight and rain, and must not be turned upside down. During the loading and unloading process, products should be handled with care, and strict precautions should be taken to prevent throwing, rolling, and heavy pressure.

4.4 Usage principles

Abuse of sodium-ion batteries may cause battery damage or personal injury. Before using sodium-ion batteries, please read the following safety rules carefully:

Note 1: If the customer needs to operate the battery under conditions outside of this document, please consult SZ ZHONGHUAJIA TECH LTD for related matters first.

Note 2: SZ ZHONGHUAJIA TECH LTD does not assume any responsibility for accidents caused by using the battery outside the conditions described in this document.

4.5 Precautions

4.5.1 It is strictly prohibited to immerse the battery in liquid;

4.5.2 It is prohibited to place the battery near high-temperature sources, such as fires, heaters, etc.;

4.5.3 Please use a special charger for sodium-ion batteries when charging;

4.5.4 It is strictly prohibited to use the battery with the positive and negative poles reversed;

4.5.5 Never throw batteries into fire or heater;

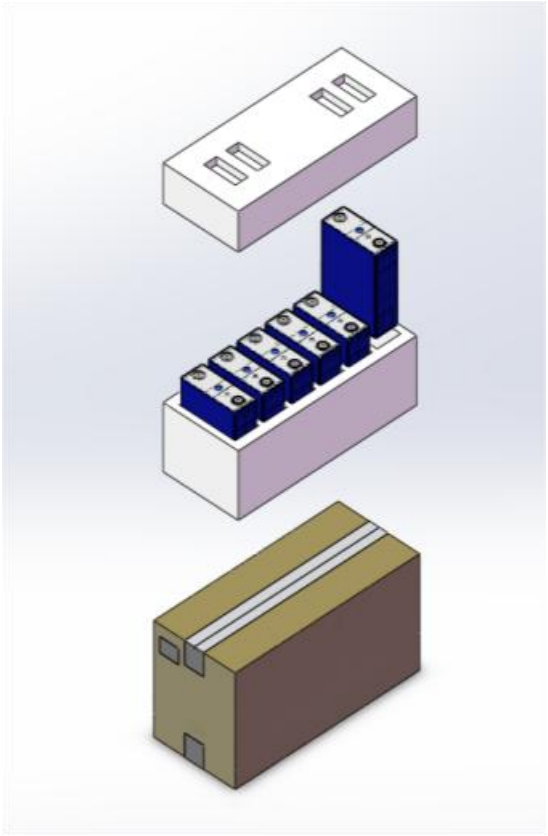
4.5.6 It is prohibited to use metal to directly connect the positive and negative terminals of the battery to cause a short circuit;

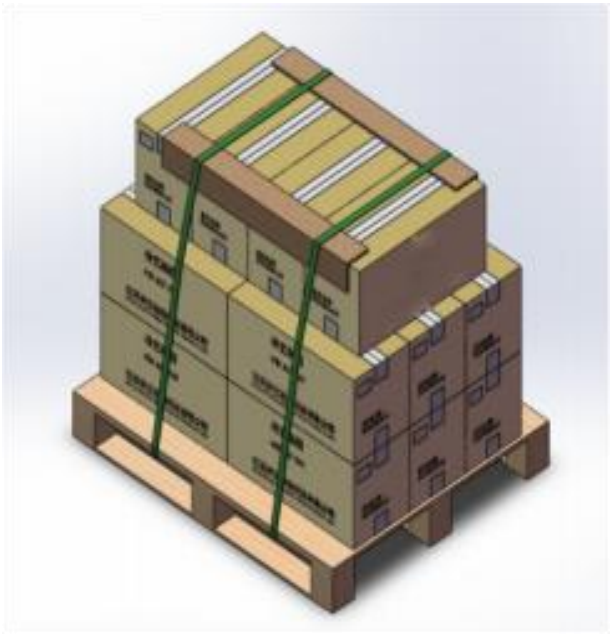
4.5.7 It is prohibited to transport or store batteries together with metal, such as hairpins, necklaces, etc.;
4.5.8 It is prohibited to knock, throw or step on batteries;
4.5.9 It is prohibited to pierce the battery with nails or other sharp objects;
4.5.10 When disposing of batteries, please separate them from other electrochemical system products.

5. Packaging and shipping

5.1 Prismatic sodium-ion batteries are shipped according to the nominal capacity of 20% to 30% SOC or customer requirements. The remaining capacity before charging after the battery is shipped depends on the storage conditions and storage time.

5.2Each small box uses card slots to place 6 batteries. Each large box is placed with 1 small box sealed and labeled. Each pallet is placed in 3 layers, with 6 large boxes placed on the 1st and 2nd layers, and 4 large boxes placed on the 3rd layer. A total of The maximum number of batteries carried on a pallet is controlled within 100.





6. Modify statement

Due to the need to continuously improve product quality and characteristics, our company has the right to revise product specifications and maintenance characteristics without notifying users in advance.

7. Modify records

序列号	修改项目	修改内容	修改人	修改日期
A1	无	电池命名规则修改	冯琳琳	2023.09.06

8. Others

Matters not mentioned in this specification must be technically confirmed by our company, and our company reserves the right of final interpretation of the contents stated in this specification.

9. Battery picture