

Prismatic Sodium-ion Battery Specification Sheet

TOPBMS

型号: NaFP71173204CY-210

版本: A1

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审核: 沈 智

批准:

发放部门:

文件编号: CY-QPS-RD003

生效日期: 2023.09.06

编制/日期	审核/日期	批准/日期

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1.Scope of Application This specification describes the performance characteristics of the NaFP71173204CY-210 sodium-ion battery product provided by TOPBMS Sodium-ion Battery Technology Co., Ltd. This product uses layered oxide cathode materials and biomass precursor hard carbon systems, exhibiting excellent low-temperature performance, rate capability, and long cycling life. The performance specifications of this product are primarily evaluated in reference to the following standards:

UN 38.3

UL 2595

GB/T34570 "Standard Testing for Rechargeable Batteries in Power Tools"

GB/T34570.2-2017 "Safety of Rechargeable Batteries and Chargers for Power Tools"

GB/T34570.2-2017 "Safety of Rechargeable Batteries and Chargers for Power Tools"

GB/T31485-2015 "Safety Requirements and Test Methods for Power Batteries in Electric Vehicles"

GB/T31484 "Performance Evaluation of Cycle Life for Power Batteries in Electric Vehicles"

2.Definitions of Terms

2.1 Battery Category: Prismatic Sodium-ion Battery

2.2 Battery Model: NaFP71173204CY-210

Na: Sodium-ion insertion system F: Iron-based cathode system R: Battery shape 71173204: Battery size CY: Battery manufacturer 210: Nominal capacity, unit: Ah

2.3 Standard Charging Method:

Charge the battery at a constant current (0.50C) in an environment at $25.0 \pm 3.0^{\circ}\text{C}$ until the single-cell voltage reaches 3.95V, then switch to constant voltage charging at 3.95V until the current reaches 0.05C, then stop charging.

2.4 Standard Discharging Method:

Discharge the battery at a constant current (0.50C) in an environment at $25.0 \pm 3.0^{\circ}\text{C}$ until the single-cell voltage reaches 1.50V.

2.5 Nominal Capacity:

Nominal capacity (Cap) is 210Ah. It is expressed in ampere-hours (Ah) and is based on the standard charge and discharge procedures defined in 2.3 and 2.4, conducted in an environment at $25.0 \pm 3.0^{\circ}\text{C}$.

2.6 Test Temperature and Humidity:

Unless otherwise specified, all product tests in this specification are conducted at a temperature of $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and a humidity of $65\% \pm 20\% \text{RH}$.

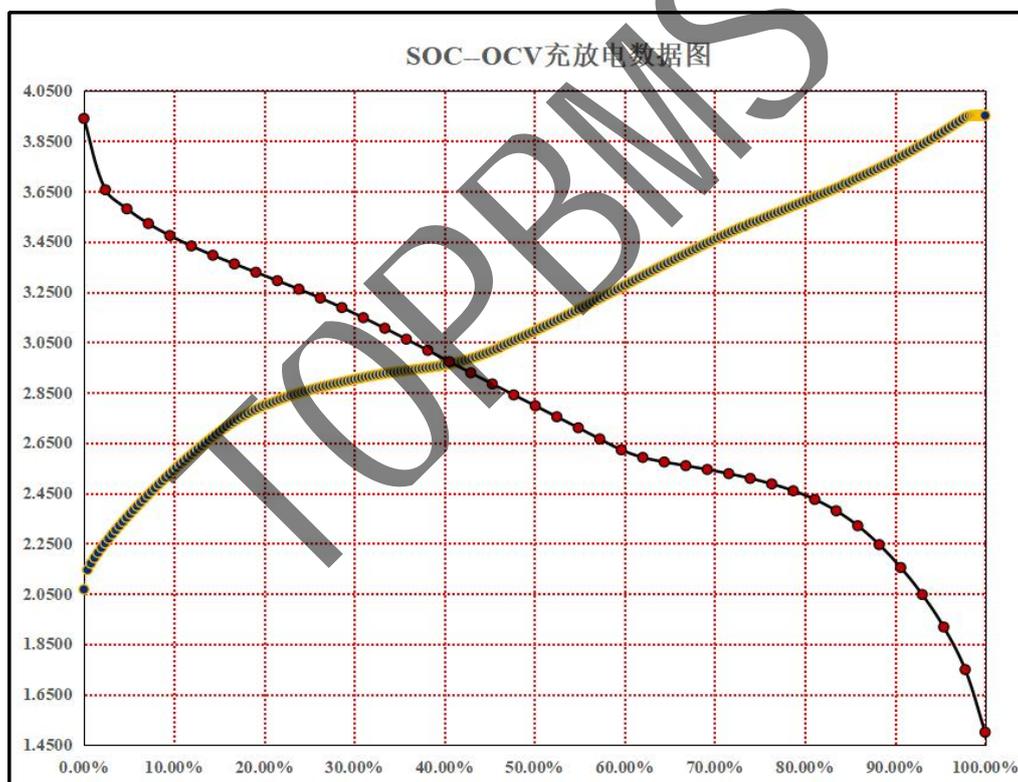
3 Battery Parameters

3.1 General Parameters

Item	Specification
Nominal Capacity	210Ah@0.50C at 25.0±3.0°C environment
Typical Capacity	215Ah@0.50C at 25.0±3.0°C environment
Nominal Voltage	≈3.10V
Upper Voltage Limit	3.95 ±0.05 V
Lower Voltage Limit	1.50 ±0.05 V Dischargeable to 0V without impact on battery performance
DC Internal Resistance	≤0.50mΩ
Battery Dimensions	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 (Charged at Shipment)	-20~60°C, well-ventilated and light-shielded
Temperature and Charging Performance	≤-20°C : Battery performance affected when in use -20~0°C : ≤0.20C 0~45°C : ≤0.50C ≥ 45°C: Battery performance affected when in use

Temperature and Discharging Performance	$\leq -40^{\circ}\text{C}$: Battery performance affected when in use $-40\sim 0^{\circ}\text{C}$: $\leq 0.50\text{C}$ $0\sim 45^{\circ}\text{C}$: $\leq 0.50\text{C}$ $45\sim 60^{\circ}\text{C}$: $\leq 0.50\text{C}$ $\geq 60^{\circ}\text{C}$: Battery performance affected when in use
Instant Maximum Discharge Current	Instantaneous Current: 3.00C Duration: $\leq 30\text{s}$
Maximum Continuous Discharge Current	Continuous Current: 1.00C Discharge temperature rise $\leq 15^{\circ}\text{C}$

3.2 Charge and Discharge Data Graphs



3.3 Cycle Parameters

3.3.1 Tested in accordance with the procedures of 2.3 and 2.4, when the actual capacity/nominal capacity is approximately 70%, the number of cycles should be ≥ 4000 .

3.4 Low-Temperature Performance

3.4.1 -40°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity $\geq 65.00\%$;

3.4.2 -30°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity $\geq 80.00\%$;

3.4.3 -20°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity $\geq 90.00\%$;

3.4.4 -10°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity \geq 97.00%.

3.5 High-Temperature Performance

3.5.1 60°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity \geq 95.00%;

3.5.2 45°C 0.5C Discharge Capacity / 25°C 0.5C Discharge Capacity \geq 100.00%.

3.7 Safety Performance

No.	Test Item	Performance Criteria	Test Conditions and Methods
1	Vibration Test	No ignition, no explosion, and no leakage	Reference: UL1642-16 After standard charging, the battery should withstand vibration with an amplitude of 0.8mm and a vibration frequency changing at a rate of 1Hz/min within the range of 10-55Hz for 60 minutes.
2	Heat Test	No ignition, no explosion	Reference: GB 38031 8.1.5 After standard charging, the oven temperature should rise to 130°C \pm 2°C at a rate of 5 \pm 2 °C/min. The battery should be kept at this temperature for 30 minutes, and observations should be made for 1 hour.
3	Short-Circuit Test	No ignition, no explosion	Reference: GB 38031 8.1.4 After standard charging, at 25°C \pm 3°C, the positive and negative terminals of the battery should be externally short-circuited for 10 minutes (external circuit resistance <5m Ω), and observations should be made for 1 hour.
4	Overcharge Test	No ignition, no explosion	Reference: GB 38031 8.1.3 After standard charging, at 25°C \pm 3°C, the battery should be charged at a constant current of 1C until reaching 5.0V or 120% SOC, then the charging should be stopped, and observations should be made for 1 hour.
5	Overdischarge Test	No ignition, no explosion	Reference: GB 38031 8.1.2 After standard charging, at 25°C \pm 3°C, the battery should be discharged at 1C until the discharge time reaches 90 minutes, and observations should be made for 1 hour.

6	Heavy Object Impact	No ignition, no explosion	Reference: UL 1642-14 After standard charging, a prismatic rod with a diameter of 15.8mm should be placed in the center of the battery, and a 9.1Kg heavy hammer should be dropped vertically from a height of 610mm onto the center of the battery.
7	Drop Test	No ignition, no explosion	Reference: GB/T 31485 6.2.5 After standard charging, the battery sample's positive and negative terminals should be dropped freely from a height of 1.0m onto a cement floor, and observations should be made for 1 hour.
8	Compression Test	No ignition, no explosion	Reference: GB 38031 8.1.7 After standard charging, the battery should be placed between the two pressing surfaces of the compression equipment, with the axis of the prismatic battery core parallel to the pressing surface. The pressure should be gradually increased to a deformation of 15%, a pressure of 100kN, or 1000 times the weight of the battery core at a pressing speed of ≤ 2 mm/s, and the pressure should be maintained for 10 minutes. Observations should be made for 1 hour.
9	Low-Pressure Test	No ignition, no explosion	Reference: UL1642-19 After standard charging, the battery should be stored for 6 hours at an absolute pressure of 11.6Kpa and a temperature of $20 \pm 5^{\circ}\text{C}$.

4 Usage Instructions

4.1 Temperature Gradient Charging Scheme

	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
Maximum 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

Sodium-ion batteries should be stored at a state of charge (SOC) between 20% and 30%, and a charge-discharge cycle should be performed every 6 months.

4.3 Battery Transportation

During transportation, sodium-ion batteries should be at an SOC between 20% and 30%. They should be packaged in boxes to prevent exposure to severe vibrations, shocks, or compression. Protect them from direct sunlight and rain, and avoid inversion. When loading and unloading, handle the products with care to prevent dropping, rolling, or heavy pressure.

4.4 Usage Guidelines

Misuse of sodium-ion batteries can lead to battery damage or personal injury. Before using sodium-ion batteries, carefully read the safety guidelines below:

Note 1: If customers intend to operate the battery under conditions not covered in this document, please consult Jiangsu Transimage Sodium-ion Technology Co., Ltd. for guidance.

Note 2: Jiangsu Transimage Sodium-ion Technology Co., Ltd. assumes no responsibility for accidents resulting from the use of this battery under conditions not specified in this document.

4.5 Precautions

4.5.1 Do not immerse the battery in any liquid.

4.5.2 Avoid placing the battery near heat sources such as fire or heaters.

4.5.3 Use a dedicated sodium-ion battery charger for charging.

4.5.4 Never use the battery if the polarity is reversed.

4.5.5 Do not throw the battery into fire or a heater.

4.5.6 Do not directly connect the battery's positive and negative terminals with metal, causing a short circuit.

4.5.7 Do not transport or store the battery with metals such as hairpins or necklaces.

4.5.8 Avoid hitting, throwing, or stepping on the battery.

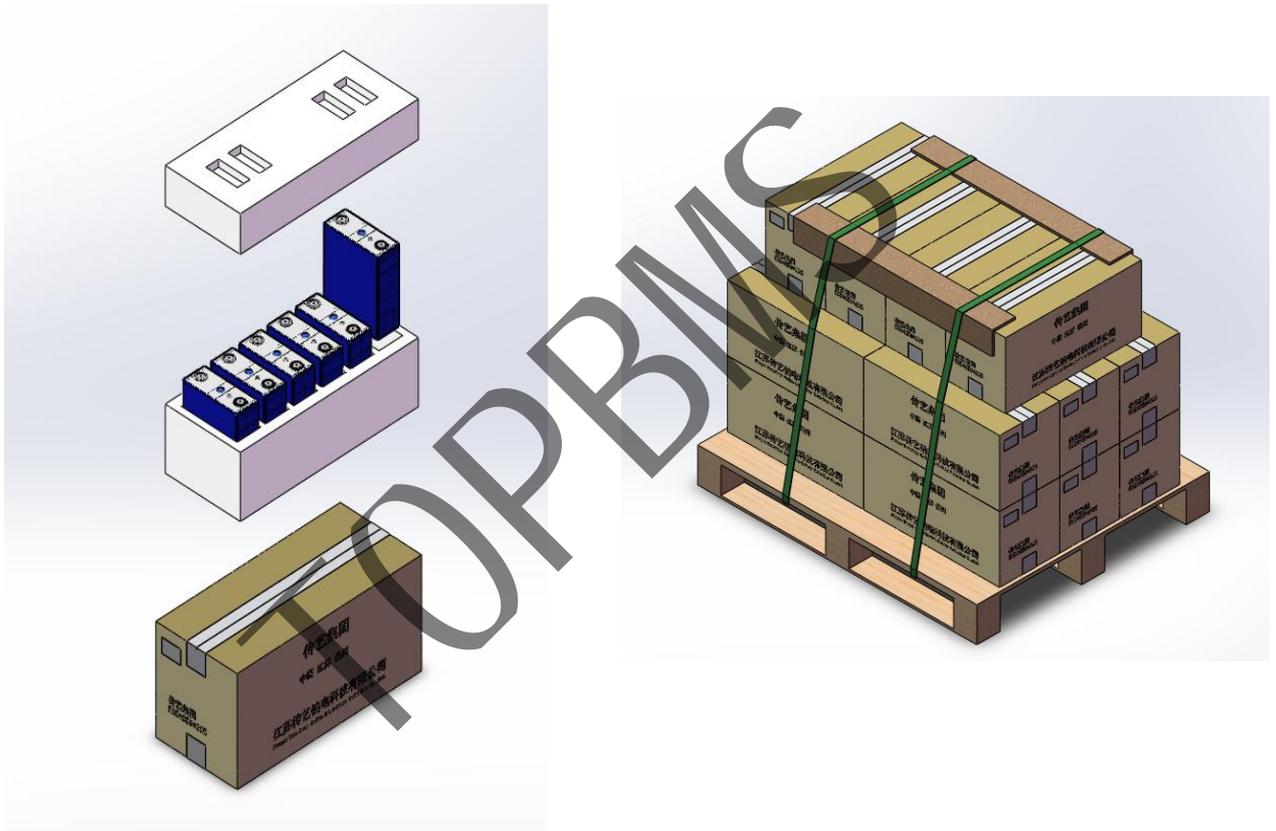
4.5.9 Do not puncture the battery with nails or other sharp objects.

4.5.10 When disposing of the battery, separate it from products of other electrochemical systems.

5 Packaging and Shipping

5.1 Round sodium-ion batteries are shipped at an SOC of 20% to 30% of their nominal capacity or as per customer requirements. The remaining capacity before charging after shipping depends on storage conditions and storage time.

5.2 Each small box is configured with slots to hold 6 batteries. Each large box contains 1 small box, sealed and labeled. Each pallet is organized into 3 layers, with 6 large boxes on the 1st and 2nd layers, and 4 large boxes on the 3rd layer. The total maximum number of batteries per pallet is limited to 100.



6 Revision Statement

In order to continuously improve product quality and characteristics, the company reserves the right to revise product specifications and maintenance characteristics without prior notice to users.

7 Revision History

序号	修改项目	修改内容	修改人	修改日期
A1	无	更改最大放电倍率	冯琳琳	2023.09.06

8 Others

For matters not mentioned in this specification, they must be confirmed by the company's technical department. The company reserves the final interpretation right for the content described in this specification.

9 Battery Images

