

## 46145-19Ah 产品规格书

## Product Specification of 46145-19Ah

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### 1. 适用范围 Scope of application

本技术协议详细描述了深圳盘古钠祥新能源有限责任公司生产的 3.0V 19Ah 钠离子电池的产品性能指标以及产品使用条件及风险警示。

The purpose of this document is to specify the specifications of 3.0V 19Ah sodium ion cells supplied by PARAGONAGE.

### 2. 产品类型 Product type

2.1 名称: 圆柱形钠离子电芯

Name: Cylindrical Na-ion Cell

2.2 型号: 46145

Model: 46145

### 3. 产品规格 Product Specification

#### 3.1 概要 General

No.	参数 Parameter	产品规格 Specification	备注 Remarks
3.1.1	额定容量 Nominal capacity	19Ah	新电池状态 Fresh cell 参考 2.2 与 2.3 标准充放电模式测试 Refer to 2.2&2.3 standard charge and discharge procedure
3.1.2	标称电压 Nominal voltage	3.0V	
3.1.3	工作电压 Operating voltage	1.5~4.0V	
3.1.4	电池内阻 Impedance (1KHz)	$\leq 1\text{m}\Omega$	新电池状态 (50%SOC) Fresh cell (50%SOC)
3.1.5	出货电量 Shipping SOC	~50%	/
3.1.6	工作温度(充电) Charging temperature	0~45℃	参考第 2.2 节 Reference to paragraph 2.2
3.1.7	工作温度(放电) Discharging temperature	-40~60℃	参考第 2.3 节 Reference to paragraph 2.3
3.1.8	电池重量 Cell Weight	约 480g	N.A.
3.1.9	存储温度 Storage Temp.	-20~30℃	约 50%SOC 存储 (About 50%SOC storage) 湿度 < 60% Humidity < 60%
3.1.10	电池尺寸 Typical dimension (D*H)	直径(Diameterh): 47.0±0.5mm 高度(Height): 150.0±0.5mm	不含极柱 Do not contain pole column

### 3.2 充电模式/参数 Charging/Parameter

No.	参数 Parameter	产品规格 Specification	备注 Remarks
3.2.1	最大持续充电电流 Maximum continuous charge current	0.2C	0-15℃@3.8A
		1.0C	15-45℃@19A
3.2.2	标准充电电流 Standard charge current	0.2C	3.8A
3.2.3	标准充电电压 Standard charge voltage	4.0V	
3.2.4	标准充电模式 Standard charge method	环境温度 25±2℃，0.2c 恒流恒压充电至 4.0V，截止电流 0.05c Ambient temperature 25 ± 2℃, 0.2c constant current constant voltage charging to 4.0V, cut-off current 0.05c	

### 3.3 放电模式/参数 Discharging/Parameter

No.	参数 Parameter	产品规格 Specification	备注 Remarks
3.3.1	最大持续放电电流 Maximum continuous discharge current	0.2C	-40-15℃@9.5A
		5.0C	15-45℃@95A
		1.0C	45-60℃@19A
3.3.2	标准放电电流 Standard discharge current	0.2C	3.8A
3.2.3	标准放电电压 Standard discharge voltage	1.5V	
3.3.4	标准放电模式 Standard discharge method	环境温度 25±2℃，0.2c 恒流放电至 1.5V Ambient temperature 25 ± 2℃, 0.2c constant current discharge to 1.5V	

### 3.4. 高低温容量 High/Low temperature capacity

No.	参数 Parameter	产品规格 Specification	条件 Condition
3.4.1	55℃ 的容量 Capacity@55℃	≥95%	新电池状态，55℃，0.2c，1.5V~4.0V Fresh cell, 55℃, 0.2c, 1.5V~4.0V
3.4.2	-20℃ 的容量 Capacity@-20℃	≥80%	新电池状态，-20℃，0.2c，1.5V~4.0V Fresh cell, -20℃, 0.2c, 1.5V~4.0V
3.4.3	-40℃ 的容量 Capacity@-40℃	≥60%	新电池状态，-40℃，0.2c，1.5V~4.0V Fresh cell, -40℃, 0.2c, 1.5V~4.0V

### 3.5 电芯温升 Cell temperature rise

本规格书中温升是指放电后的电池表面温度减去放电前的电池表面温度。电池温升的测量应在环境温度较为稳定且空间足够大的房间里进行。每个电池温度测量应选取经过校正的可以记录时间数据的温度感应器。

The temperature rise refers to the surface temperature of the cell after discharge minus the surface temperature of the cell before discharge. The measurement of the temperature rise of the cell should be carried out in a room where the ambient temperature is relatively stable and the space is large enough. For each cell temperature measurement, a calibrated temperature sensor that records time data should be selected.

No.	参数 Parameter	产品规格 Specification	条件 Condition
3.5.1	持续放电温升 Continuous discharge temperature rise	$\leq 10^{\circ}\text{C}$	电池以标准放电模式进行放电 The cell is discharged in the standard discharge method.
3.5.2	持续放电温升 Continuous discharge temperature rise	$\leq 30^{\circ}\text{C}$	电池以最大放电模式进行放电 The cell is discharged in the max discharge method.

### 3.6. 产品性能 Product property

#### 标准测试条件 Standard Test Conditions

测试必须使用出厂时间不超过一个星期的新电池，且未进行过五次以上的充放电循环。除非特别说明，否则测试会在温度  $20 \pm 5^{\circ}\text{C}$ ，相对湿度 45~85% 的条件下进行。如果经鉴定测试结果不受上述条件影响，测试也可以在温度  $15 \sim 30^{\circ}\text{C}$ ，相对湿度 25~85%RH 的条件下进行。

Test should be conducted with new batteries within one week after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise specified, test and measurement shall be done under temperature of  $20 \pm 5^{\circ}\text{C}$  and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature  $15 \sim 30^{\circ}\text{C}$  and humidity 25~85%RH

#### 3.6.1 电性能 Electric performance

项目 Item	测试方法 Test method	标准 Standard
3.6.1.1 容量 Capacity	25°C ± 2°C 环境下，电芯 0.2C 恒流恒压充至 4.0v，截止电流 0.05C；搁置 5min，0.2C 放电至 1.5v。 At 25°C ± 2°C, the cell is 0.2C to 4.0v and the cut-off current is 0.05C; the 5min, 0.2C discharges to 1.5v.	放电容量 ≥ 19Ah Discharge capacity ≥ 19Ah
3.6.1.2 常温循环 Cycle Life Test at RT	①充电：0.5C 恒流恒压充电至到 3.9v，截止电流 0.06C，搁置 5min； ②放电：1.0C 恒流放电到 2.0V，搁置 5min； ③循环以上两步 1500 次。 ①Charging: 0.5C to 3.9v and then to CV and the cut-off current was 0.05C and placed 5min; ②Discharging: 0.5C to 2.0V and placed 5min ③Cycled the above mentioned 2steps for 1500cycles	循环容量保持率 ≥ 70% Capacity retention rate ≥ 70%
3.6.1.3 倍率放电 Rate discharge	25°C ± 2°C 环境下，电芯 0.2C 恒流恒压充至 4.0v，截止电流 0.05C；搁置 5min，以不同电流放电至 1.5v。 At 25°C ± 2°C, the cell is 0.2C to 4.0v and the cut-off current is 0.05C; hold for 5min and discharge to 1.5v with different currents.	1c 放电容量保持率 ≥ 98% 3c 放电容量保持率 ≥ 95% 5c 放电容量保持率 ≥ 93%

### 3.6.2 安全性能 Safety performance

项目 Item	测试方法 Test method	标准 Standard
3.6.2.1 过充电 Over Charge	电芯按照标准充电模式充满电后，再以 0.5C 电流充电到 4.4V 或 115%SOC 停止充电 After the cell is fully charged in the standard charging mode, it is then charged with 0.5C current to 4.4V or 115% SOC to stop charging	不起火、不爆炸 no fire, no explosion
3.6.2.2 过放电 Over Discharge	电芯按照标准充电模式充满电后，再以 1C 电流放电 90min After the cell is fully charged according to the standard charging mode, it is discharged with 1C current for 90min	不起火、不爆炸 no fire, no explosion
3.6.2.3 短路 Short Circuit	电芯按照标准充电模式充满电后，直接短路其正、负极（线路总电阻不大于 5mΩ）10 min 结束，观察电芯的温度及外观变化。 After the cell is fully charged according to the standard charging mode, it will directly short circuit the positive and negative poles (the total resistance of the line is not more than 5m Ω) for 10 min, and observe the temperature and appearance changes of the cell.	不起火、不爆炸 no fire, no explosion
3.6.2.4 温度循环 High and low temperature shock	电芯按照标准充电模式充满电后，放入温度-40℃的低温环境中搁置 1h，再在 85℃条件下搁置 1h，如此循环 32 次结束试验，试验结束后将样品取出。 After the cell is fully charged according to the standard charging mode, it is put in a low temperature environment of -40℃ for 1h, and then for 1h at 85℃. End the test for 32 cycles, and the sample is taken out after the test	不起火、不爆炸 no fire, no explosion
3.6.2.5 加热 Heat additive	电芯按照标准充电模式充满电后，将电芯放置在加热试验箱中，以 5℃/min 的速度由室温升至 130℃±2℃ 并保持 30 分钟。 After the cell is fully charged in the standard charging mode, place the cell in a heating test chamber, rise from room temperature to 130℃±2℃ at 5℃ / min and hold for 30 min	不起火、不爆炸 no fire, no explosion
3.6.2.6 低气压 Low-pressure test	电芯按照标准充电模式充满电后，电芯在绝对压力为 11.6kPa，温度为室温条件下搁置 6 小时。 After the cell is fully charged according to the standard charging mode, the cell is 11.6kPa for 6 hours at room temperature.	不起火、不爆炸 no fire, no explosion



3.6.2.7 挤压 Crush	<p>电芯按照标准充电模式充满电后，用半径为 75mm 的半圆柱体挤压板以 <math>(2 \pm 1)</math> mm/s 的速度沿垂直于电芯极板方向对电芯施压，当电压达到 0V 或变形量达到 15% 或挤压力达到 2.67kN 后停止测试</p> <p>After the cell is fully charged according to the standard charging mode, the half cylinder plate with a radius of 75mm is used to press the cell in the direction vertical to the cell plate at the speed of <math>(2 \pm 1)</math> mm / s. When the voltage reaches 0V or the deformation reaches 15% or the extrusion pressure reaches 2.67 kN</p>	<p>不起火、不爆炸</p> <p>no fire, no explosion</p>
3.6.2.8 重物冲击 Heavy impact	<p>电芯按照标准充电模式充满电后，将一直径为 15.8mm 的钢棒放置于电芯中部；然后将重量为 <math>9.1 \pm 0.1</math> kg 的铁锤从 <math>610 \pm 25</math> mm 高处自由落体到电芯上</p> <p>After the cell is fully charged in the standard charging mode, place a steel rod of 15.8mm diameter in the middle of the cell; then drop the hammer of <math>9.1 \pm 0.1</math> kg freely onto the cell from the height of <math>610 \pm 25</math> mm</p>	<p>不起火、不爆炸</p> <p>no fire, no explosion</p>
3.6.2.9 跌落测试 Drop test	<p>电芯按照标准充电模式充满电后，按 1.2m 的跌落高度自由落体跌落于混凝土板上，单体电芯两个端面各跌落两次，共计进行四次跌落试验</p> <p>After the cell is fully charged according to the standard charging mode, the free falling body falls on the concrete plate at a drop height of 1.2m. The two end surfaces of the single cell fall twice each, with a total of four drop tests</p>	<p>不起火、不爆炸</p> <p>no fire, no explosion</p>
3.6.2.10 振动测试 Vibration test	<p>电池电芯按照标准充电模式充满电后，将电池用夹具安装在振动台的台面上，按下面的振动频率和对应的振幅调整好试验设备。X、Y、Z 三个方向每个方向上从 10~55Hz 循环扫频振动 90—100min，扫频速率为 1Hz/min，位移幅值（单振幅）：0.16mm</p> <p>After the battery cell is fully charged according to the standard charging mode, install the battery fixture on the surface of the vibration table, and adjust the test equipment according to the vibration frequency and the corresponding amplitude below. In each direction of X, Y and Z, the frequency is swept for 90-100min, and the sweep rate is 1Hz / min, displacement amplitude (single amplitude): 0.16mm</p>	<p>不漏液、不起火、不爆炸</p> <p>no leakage, no fire, no explosion</p>



#### 4. 运输与贮存 Transport and Storage

4.1 电芯运输荷电状态为 20%~50%SOC，电芯包装成箱进行运输，在运输过程中应防止剧烈振动、冲击或挤压，防止日晒雨淋，不得倒置。

The state of charge of cell transportation is range from 20% to 50% SOC. Cells are packed in boxes for transportation. Violent vibration, shock or extrusion should be prevented during transportation, sunshine and rain should not be inverted.

4.2 在装卸过程中，产品应轻搬轻放，严防摔掷、翻滚、重压。

In the process of loading and unloading, the products should be handled lightly by handled lightly. Throwing, rolling and heavy pressure should be strictly prevented.

4.3 若预计将电池存放 30 天以上的，建议将 SOC 调整为 50%左右。单体电池，-10~30℃建议补电周期为 6 个月，30~45℃建议补电周期为 3 个月，45℃~60℃建议补电周期为 1 个月；以上补电周期为建议，实际存储 SOC 不得低于 8%。存储周期不考虑 BMS 或其他除单体电池以外的自耗电影响。

When the Products are intended to be stored for a prolonged period of time (more than one month), the SOC of cells should be adjusted to around 50% periodically(every three months is recommended). For cell, the recommend period to recharge is 6 months at -10~30℃; the recommend period to recharge is 3 months at 30~45℃; the recommend period to recharge is 1 months at 45~60℃. The recharge period is for reference, and the SOC cannot be less than 8% for storage. The storage considers the self-discharge of cells only.

#### 5. 安全事项 Security matters

为避免电芯发生泄漏、发热、燃烧、爆炸等危险，请注意：

In order to avoid the dangers of leakage, heated, combustion and explosion of cells, please pay attention to:

a. 严禁将电芯浸入液体中，贮存不用时，应放置于阴凉干燥的环境中

It is strictly forbidden to immerse cells in liquids. When not in use, cells should be stored in a cool and dry environment

b. 禁止将电芯置于高温热源旁，如火、加热器等

It is forbidden to place cells near high-temperature heat sources, such as fires, heaters, etc.

c. 充电时请选用钠离子电池专用充电器

When charging, please choose a special charger for sodium-ion cells

d. 严禁颠倒正负极使用电芯

It is strictly forbidden to use cells by reversing the positive and negative electrodes

e. 禁止用金属直接连接电芯正负极使电芯短路

It is forbidden to connect the positive and negative electrodes of cells directly with metals to make them short-circuit

f. 禁止敲击或抛掷、踩踏和弯折电芯

Striking or throwing, trampling and bending cells are prohibited

g. 禁止用钉子或其他利器刺穿电芯

It is forbidden to pierce the cell with nails or other sharp tools

h. 禁止在高温下使用电芯

Cells are prohibited at high temperatures

i. 禁止在强静电和强磁场的地方使用电芯

It is forbidden to use cells in places with strong static and magnetic fields

j. 如果电芯发生泄漏，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 enter the eyes, please don't rub it. Rinse your eyes with clean water and send to the hospital immediately

k. 如果电芯发出异味、发热、变色、变形或使用、贮存、充电过程中出现任何异常，立即将电芯从装置或充电器中移开并停用

If there is any abnormality in the process of odor, heat, discoloration, deformation or use, storage and charging, remove the cell from the device or charger immediately and stop using it;

l. 防止电芯包装内产生短路，引线与电芯之间要有足够的绝缘层以保证绝对安全。外壳内不得有任何短路发生，以防止冒烟或着火

To prevent short circuit in cell packaging, there should be enough insulation between lead and cell to ensure absolute safety. No short circuit shall occur in the enclosure to prevent smoke or fire

m. 严禁拆卸电芯，更换电芯时应由电芯供应商或设备供应商完成，用户不得自行更换

Disassembly of cells is strictly prohibited. Replacement of cells should be completed by cell suppliers or equipment suppliers. Users are not allowed to replace cells by themselves

n. 禁止使用已损坏的电芯

Using damaged cells is prohibited

o. 禁止和不同型号，不同品牌的电芯混用

It is forbidden to mix cells of different models and brands

p. 禁止新旧电芯，不同材料的电芯混用

It is forbidden to mix old and new cells with cells of different materials

## 6. 免责声明 Disclaimer

6.1. 如果由于产品需求单位不按本说明书中的规定进行使用，造成社会性影响，并对深圳盘古钠祥新能源有限责任公司的声誉造成影响的，深圳盘古钠祥新能源有限责任公司将会追究产品需求单位的责任。

If the product demand unit does not use the product according to the provisions of this specification, causing social impact and affecting the reputation of PARAGONAGE, PARAGONAGE will investigate the responsibility of the product demand unit.

6.2. 买方在订购深圳盘古钠祥新能源有限责任公司产品前，需要与深圳盘古钠祥新能源有限责任公司提前确认产品的最新状态。

Before ordering PARAGONAGE products, the buyer needs to confirm the latest status of the products in advance with PARAGONAGE.

6.3. 英文规格释义仅供参考，请以中文版技术规格要求为准。

English specifications are for reference only. Please refer to the technical specifications of the Chinese version.

## 7. 风险警告 Risk Warning

### 7.1. 警示声明 Waring statement

#### 警告

电池存在潜在的危险，在操作和维护时必须采取适当的防护措施！

不正确地滥用测试实验，可能导致严重的人身伤害和财产损失！

必须使用正确的工具和防护装备操作电池。

电池的维护必须由具有电池专业知识并经过安全培训的人士执行。

不遵守上述警告可能造成多种灾难。

CELLS ARE POTENTIALLY DANGEROUS AND PROPER PRECAUTIONS MUST BE OBSERVED IN HANDLING AND MAINTENANCE.

RUNNING TESTS ON THE CELLS IMPROPERLY MAY RESULT IN SEVERE PERSONAL BODY INJURY OR PROPERTY DAMAGES.

WORK ON CELLS MUST BE PERFORMED ONLY WITH PROPER TOOLS AND PROTECTIVE EQUIPMENT MUST BE USED.

CELL MAINTENANCE MUST BE CARRIED OUT BY PERSONNEL KNOWLEDGEABLE OF CELLS AND TRAINED IN THE SAFETY PRECAUTIONS INVOLVED.

FAILURE TO OBSERVE THE ABOVE MAY CAUSE VARIOUS HAZARDS.

### 7.2. 危险类型: Types of Hazards

客户知悉在电池使用和操作过程中存在以下潜在的危险:

Customer acknowledges the following potential hazards in connection with the usage and handling of the Products:

7.2.1 操作者在操作时可能会受到化学品、电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

Working with battery can expose the handler to chemical, shock and/or arcing hazards. Although a person's body might react to contact with direct current voltage differently than from contact with alternate current voltage, Customer shall take a conservative position and consider the risk of shock or electrocution to be the same for both alternate current and direct current exposures greater than 50 V.

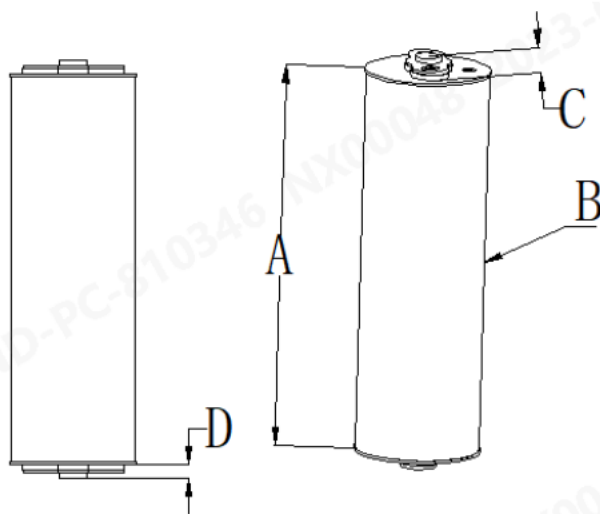
7.2.2 存在来自电池中的电解液的化学风险。

Cells expose its handler to chemical hazards associated with the electrolyte used in the cell.

7.2.3 在操作电池和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险，防止发生意外短路，造成电弧、爆炸或热失控。

When selecting work practices and personal protective equipment, customer and its employees should consider potential exposure to these hazards and therefore prevent accidental short-circuit that can result in electrical arcing, explosion, and/or "thermal runaway" of the cells.

### 8. 电芯图纸 Cell drawings



NO	Items	Size(mm)
1	A/长度	150±0.4
2	B/直径	47±0.5
3	C/极柱高度	4.5±0.1
4	D/负极极柱高度	4.5±0.1