

固态锂电池 SHP270-17 产品规格书

Specification of Solid-state Lithium-ion Battery SHP270-17

电芯型号 Cell Model: PL8674172-17Ah

电芯容量 Cell Capacity: 17Ah

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北京卫蓝新能源科技股份有限公司
Beijing WeLion New Energy Technology Co., Ltd

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1. 适用范围 Scope

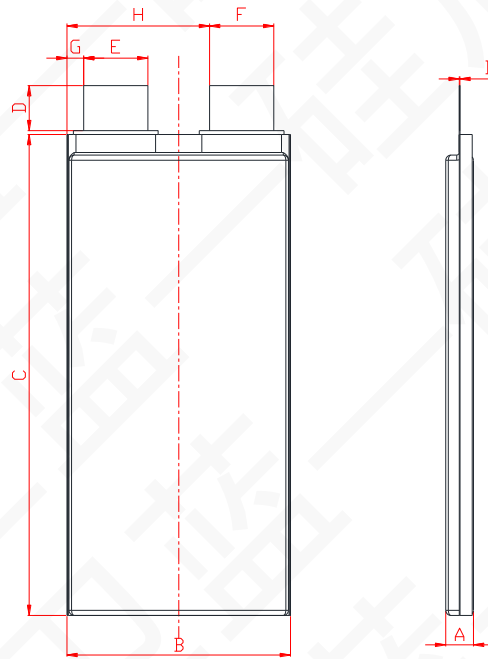
本产品规格书详细描述了北京卫蓝新能源科技股份有限公司（以下简称“卫蓝”）生产的 17Ah 固态锂离子电芯（功率型）新电芯状态的产品性能指标以及产品使用条件。

The purpose of this document is to specify the specifications of 17Ah hybrid solid-state lithium-ion (power type) fresh cell for energy storage system (“Product”) to be supplied by Beijing WeLion New Energy Technology Co., Ltd.

2. 产品型号 Cell Model

PL8674172-17Ah

3. 产品尺寸 Product Dimension



项目代码 Code	项目名称 Items	尺寸 Dimension	测试工具 Test tools
A	厚度 Thickness	8.6±0.3mm	游标卡尺 Vernier scale
B	宽度 Width	74±1mm	游标卡尺（测试时，折边需紧贴本体） Vernier scale (The edge-fold tightly against the cell body when testing)
C	长度 Length	172±2mm	菲林尺 Film ruler
D	极耳长度（正） Tab length (P)	17±3mm（铝转铜镀镍极耳 Aluminum to copper nickel plated tab）	菲林尺 Film ruler

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		19±3mm (铝极耳 Aluminum tab)	
	极耳长度 (负) Tab length (N)	19±3mm	
E	极耳宽度 (正) Tab width (P)	25±0.5mm	菲林尺 Film ruler
F	极耳宽度 (负) Tab width (N)	25±0.5mm	菲林尺 Film ruler
G	极耳边距 (正) Tab margin (P)	6.5±2.0mm	菲林尺 (测试时, 折边需紧贴本体), Film ruler (The edge-fold tightly against the cell body when testing)
H	极耳边距 (负) Tab margin (N)	42.5±2.0mm	
I	极耳厚度 Tab thickness	正极耳 Positive tab: 0.3±0.05mm 负极耳 Negative tab: 0.2±0.05mm	千分尺 Micrometer

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4. 产品规格 Product Specification

No.	项目 Items		技术指标 Criteria
1	标称容量 Nominal capacity		17Ah (0.5C)
2	标称电压 Nominal voltage		3.7V
3	充电终止电压 Charge cut-off voltage		4.2V
4	放电终止电压 Discharge cut-off voltage		3.0V
5	充电方法 Charge method	超快 Ultrafast	2C (34A) 恒流 (CC) 充电至 4.2V, 再恒压 (CV) 充电至充电电流小于 0.02C (0.34A) 2C (34 A) constant current (CC) charge to 4.2V, then constant voltage (CV) charge till charge current decline to $\leq 0.02C$ (0.34A)
		快速 Fast	1C (17A) 恒流 (CC) 充电至 4.2V, 再恒压 (CV) 充电至充电电流小于 0.02C (0.34A) 1C (17A) constant current (CC) charge to 4.2V, then constant voltage (CV) charge till charge current decline to $\leq 0.02C$ (0.34A)
		标准 Standard	0.5C (8.5A) 恒流 (CC) 充电至 4.2V, 再恒压 (CV) 充电至充电电流小于 0.02C (0.34A) 0.5C (8.5A) constant current (CC) charge to 4.2V, then constant voltage (CV) charge till charge current decline to $\leq 0.02C$ (0.34A)
6	放电方法 Discharge method	脉冲 Pulse	10C (170A、持续时间 $\leq 10S$) 10C (170A, duration $\leq 10S$)
		高倍率 High-rate discharge	5C-7C (85A-119A)
		倍率 Rate discharge	3C (51A)
		标准 Standard	0.5C (8.5 A)
7	循环寿命 Cycle life	容量保持率 $\geq 80\%$ Capacity retention $\geq 80\%$	≥ 500 次 (25 ± 2 °C, 0.5C/3C; 100% DOD) ≥ 500 cycles (25 ± 2 °C, 0.5C/3C, 100% DOD)
8	工作温度 Operating temperature		充电 Charge: 0°C~45°C 放电 Discharge: -20°C~55°C
9	保护温度		充电 Charge: 0°C~55°C

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	Protection temperature	放电 Discharge: -20°C~60°C
10	储存温度 Storage temperature	短期存储 (1 个月) Short-term (one month): -20°C~45°C 长期存储 (6 个月) Long-term (six months): -10°C~35°C
11	存储湿度 Storage humidity	≤85%RH
12	能量密度 Energy density	重量比能量 Weight Specific Energy: >270Wh/Kg (0.5C) 体积比能量 Volume Specific Energy: >560Wh/L (0.5C)
13	交流内阻 AC impedance	1.3±0.5mΩ
14	重量 Weight	250.7±4g

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5. 电性能测试 Electrical Performance Test

5.1 标准充电 Standard Charge

25±2°C, 0.5C (8.5A) 恒流充电至 4.2V, 然后采用 4.2V 恒压充电, 截止电流 0.02C (0.34A), 静置 30min.

At 25±2°C, charge the cell at 0.5C (8.5A) constant current till the voltage reaches 4.2V, and then charge at 4.2V constant voltage till the current drops to 0.02C (0.34A), rest 30min.

5.2 标准放电 Standard Discharge

25±2°C, 0.5C (8.5A) 恒流放电至 3.0V, 静置 30min.

At 25±2 °C, discharge the cell at 0.5C (8.5A) constant current till the voltage drops to 3.0V, rest 30min.

5.3 电性能参数 Electrical Performance

No.	项目 Items	性能参数 Performance	测试方法 Test methods
1	容量 Capacity	≥17Ah	按照 5.1、5.2 节进行标准充、放电, 记录放电容量。 Charge and discharge the cell according to standard methods of 5.1 and 5.2, and record the discharge capacity.
2	能量 Energy	≥62.9Wh	按照 5.1、5.2 节进行标准充、放电, 记录放电能量。 Charge and discharge the cell according to standard methods of 5.1 and 5.2, and record the discharge energy.
3	倍率放电 Rate discharge	0.5C ≥标称容量×100% 3C ≥标称容量×95% 5C ≥标称容量×90% 0.5C≥Nominal capacity × 100% 3C≥Nominal capacity × 95% 5C≥Nominal capacity × 90%	在 1 标准大气压, 环境温度 25±2°C, 相对湿度为≤85%RH 的条件下, 电池 0.5C 标准恒流恒压充电后分别以 0.5C、3C、5C 电流放电, 直到放电终止电压 3.0V。允许循环三次, 当有一次达到标准, 即达到要求。 Under the condition of 1 standard atmospheric pressure, ambient temperature 25±2°C, relative humidity≤85%RH, 0.5C constant current constant voltage charge the cell to 4.2V till the current drops to 0.02C, followed by a 30-minute rest period, and discharge the cell at 0.5C/3C/5C till the voltage drops to 3.0V separately, followed by a 30-minute rest period. Cycles times ≤ 3, and if one of them reaches the standard, the requirements are met.

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4	25°C 荷电保持与恢复 Charge retention and recovery at 25°C	保持容量 \geq 标称容量 $\times 90\%$ 恢复容量 \geq 标称容量 $\times 95\%$ Capacity retention \geq Nominal capacity $\times 90\%$ Recovery capacity \geq Nominal capacity $\times 95\%$	<p>电池 0.5C 标准恒流恒压充电后, 25\pm2°C 条件下放置 28 天, 以 0.5C 放电至 3.0V, 测量电池的剩余容量; 0.5C/0.5C 测量电池的恢复容量。可循环三次, 当有一次达到标准, 即达到要求。</p> <p>After being standard charged at 0.5C, the cell is stored in an oven at 25\pm2°C for 28 days, record the residual capacity in a standard discharge method at 0.5C till the voltage drops to 3.0V. And record the recovery capacity in a standard charge and discharge method at 0.5C. Then calculate the retention rate and recovery rate. Cycles times ≤ 3, and if one of them reaches the standard, the requirements are met.</p>
5	循环寿命 Cycle life	容量 \geq 初始循环容量 $\times 80\%$ Capacity \geq Initial capacity $\times 80\%$	<p>环境温度 25\pm2°C, 0.5C 恒流恒压充电到 4.2V, 截止电流 0.02C, 搁置 30min 后, 以 3C 恒流放电至 3.0V, 搁置 30min, 重复上述步骤, 直至循环容量衰减到初始循环容量的 80%。</p> <p>Under the condition of ambient temperature 25\pm2°C, 0.5C constant current constant voltage charge the cell to 4.2V till the current drops to 0.02C, followed by a 30-minute rest period, and discharge the cell at 3C till the voltage drops to 3.0V, followed by a 30-minute rest period, repeat the above steps until the cycle capacity decays to 80% of the initial capacity.</p>
6	-20°C 低温放电性能 -20°C low temperature discharge	容量 \geq 标称容量 $\times 70\%$ Capacity \geq Nominal capacity $\times 70\%$	<p>电池 0.5C 标准恒流恒压充电后, 在 -20\pm2°C 环境搁置 8h, 以 0.5C 放电至 3.0V, 测量电池的放电容量。</p> <p>After being standard charged at 0.5C, the cell is stored at -20\pm2°C for 8h, record the discharge capacity in a standard discharge method at 0.5C till the voltage drops to 3.0V.</p>
7	55°C 高温放电性能 55°C high temperature discharge	容量 \geq 标称容量 $\times 98\%$ Capacity \geq Nominal capacity $\times 98\%$	<p>电池 0.5C 标准恒流恒压充电后, 在 55\pm2°C 搁置 4h, 以 0.5C 放电至 3.0V, 测量电池的放电容量。</p> <p>After being standard charged at 0.5C, the cell is stored at 55\pm2°C for 4h, record the discharge capacity in a standard discharge method at 0.5C till the voltage drops to 3.0V.</p>

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8	贮存性能 Storage performance	贮存 3 个月 贮存 6 个月 贮存 12 个月 3 months 6 months 12 months	测量电池初始容量, 电池标准充电后, 记录贮存前的初始状态, 分别在室温贮存 3 个月、6 个月、12 个月后, 测量电池的最终状态, 然后 0.5C/0.5C 循环 3 次记录电池放电容量。 Record initial status and initial capacity of the cell. Standard charge the cell and store it for 3 months, 6 months and 12 months respectively. Record the final state of cell, then charge and discharge the cell in a standard charge and discharge method at 0.5C for 3 cycles, and record the discharge capacity.
9	过充电 Overcharge	不起火、不爆炸 No fire No explosion	电池 0.5C 标准放电后, 以 1.5C (标准充电电流的 3 倍) 恒流充电至 4.6V: 充电时间 $\geq 7h$ 或电池表面温度低于峰值 20%, 停止充电。 After being standard discharged to 3.0V at 0.5C constant current, the cell is charged to 4.6V at 1.5C (three times the standard charging current). Stop charging until the charging time is longer than 7 h or the surface temperature of the cell is below 20% of the maximum temperature.
10	强制放电 Forced-discharge	不起火、不爆炸、不漏液 No fire No explosion No leakage	电池 0.5C 标准放电后, 以 1.0C 恒流反向充电 90min, 观察 1h。 After being standard discharged to 3.0V at 0.5C constant current, the cell is reversely charged at the current of 1.0C for 90 min, then observe for 1h.
11	短路 Short circuit	不起火、不爆炸、 温度 $\leq 150^{\circ}\text{C}$ No fire No explosion The temperature $\leq 150^{\circ}\text{C}$	电池 0.5C 标准恒流恒压充电后, 在 $25\pm 2^{\circ}\text{C}$ 条件下搁置 1h, 置于防爆箱中直接短路其正负极 (线路总电阻 $80\pm 20\text{m}\Omega$), 电池温度下降到比峰值小 20%或短路时间 $\geq 24h$, 停止实验。 After being charged with standard constant current and voltage, the cell is placed at $25\pm 2^{\circ}\text{C}$ for 1h. Place the cell in explosion proof box and connect the positive and negative terminals directly by a $80\pm 20\text{m}\Omega$ wire. Stop charging until the surface temperature of the cell is below 20% of the maximum temperature, or the testing time is longer than 7 hours.
12	温度循环 Temperature cycling	不起火、不爆炸、不漏液 No fire No explosion No leakage	1、电池按照标准充电方式充电完成; 2、电池置入室温温度箱中, 进行以下步骤: ——温度箱升温至 75°C , 并保持 6h, 升温时间 $\leq 30\text{min}$; ——温度箱温度降至 -40°C , 并保持 6h, 温度转换时间

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				<p>≤30min;</p> <p>——重复循环以上步骤，循环 10 次;</p> <ol style="list-style-type: none"> The cell is charged with standard constant current and voltage; The cells are placed in a test chamber and subjected to the following cycles: <p>——Raise the chamber-temperature to 75°C within 30 min and maintain this temperature for 6 h.</p> <p>——Reduce the chamber temperature to -40°C within 30 min and maintain this temperature for 6 h.</p> <p>——Repeat the above steps for 10 cycles.</p> 	
13	挤压 Crush		<p>不起火、不爆炸</p> <p>No fire</p> <p>No explosion</p>	<ol style="list-style-type: none"> 电池按照 0.5C 标准充电方式充电完成; 挤压，挤压方式如下： 挤压方向：垂直于极板方向施压； 挤压板形式：平面压板尺寸大于电池被挤压面尺寸； 挤压力：13±0.78kN； 压力达到即可停止实验。 <ol style="list-style-type: none"> The cell is charged with standard constant current and voltage; Crush, crush method is as follows: Direction of crush: vertical to the cell electrode plate Force of crush: 13±0.78kN; Stop crushing until the maximum force has been reached. 	

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6. 外观检查 Appearance

不允许有任何影响电池性能的外观缺陷，如划痕、裂纹、泄漏等。

There shall be no such defect as scratch, crack, leakage, which may adversely affect the performance of battery.

7. 标准测试环境 Standard Test Condition

除非特别说明，本规格书中所有测试均在以下环境条件下进行：

Unless otherwise specified, all tests in this specification are performed under the following environmental conditions:

- 温度 Temperature: $25 \pm 2^{\circ}\text{C}$
- 湿度 Humidity: $\leq 85\%\text{RH}$
- 大气压 Atmospheric pressure: 86~106kPa

8. 包装 Package

8.1 电池的包装应符合防潮防震的要求，详细包装如下：

The cell shall be packed in accordance with the requirements of moisture-proof and shock-proof. The detailed packaging is as follows:

- 单个电池使用无色塑料托盘存放，每盘4只；
- Cell is stored in a colorless plastic tray, and there are 4 cells in every tray;
- 外包装为纸箱，每箱20盘共80只。
- The outer packing is carton, where 80 pieces cells in 20 trays per carton is.

8.2 包装箱内应装入随同产品提供的文件：

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);
- 产品检验报告。 Product inspection report.

8.3 运输过程建议电芯荷电状态低于30%。

It is advisable to maintain the battery cell's state of charge below 30% during transportation.

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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:

- 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 (固态锂电池)、产品型号、产品等级、数量、QC pass 章
- Product name (solid-state lithium-ion cell), product model, product grade, quantity, QC pass seal

10. 存储及其他事项 Storage and Others

10.1 长期储存 Long term storage

预计将电芯存放 30 天以上的, 应定期 (建议每隔 3 个月) 按照 5.1、5.2 节中的标准充、放电模式做一次充放电, 然后将 SOC 调整为 20%~40%。

When the Products are intended to be stored for a prolonged period of time (more than one month), conduct one cycle of charging and discharging according to the standard charging and discharging mode in Section 5.1 & 5.2 and then adjust SOC to 20%~40%SOC。

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 that this specification does not cover should be conferred between the customers and Beijing WeLion New Energy Technology Co., Ltd.

11. 保质期 Period of Warranty

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保质期是从生产日期（喷码批次）开始起 12 个月。在保质期内，卫蓝可对因电芯生产制造过程中产生缺陷的电芯进行免费更换。

The period of warranty is 12 months from the production date (spraying code batch). During the period of warranty, WeLion can replace batteries that have defects during the manufacturing process for free.

12. 产品责任 Responsibility

客户应当确保严格遵守以下与电芯相关的应用条件，未在以下应用条件下使用电芯，或相关应用条件失效时，造成的经济损失，卫蓝不承担相关经济赔偿责任：

Customer shall ensure that the following application conditions in connection with the products are strictly observed. WeLion is not responsible for the economic losses caused by the failure of the battery under the following application conditions or the failure of the relevant application conditions:

12.1 客户端收到到货电芯后，应在 7 天内完成入库检验，具体参考双方协商的检验规范；

12.1 After receiving the delivered batteries, the client should complete the warehousing inspection within 7 days. Refer to the inspection specifications negotiated by both parties for details.

12.2 工作环境温度范围：充电：0℃~45℃；放电：-20℃~55℃

12.2 Operating environment temperature range: charge 0℃~45℃; discharge -20℃~55℃

12.3 出货态电芯短期储存温度范围（1 个月内）：-20℃~45℃

12.3 Shipped cells short term storage temperature range (within 1 month): -20℃~45℃

12.4 相对湿度：≤85%RH

12.4 Relative humidity: ≤85%RH

12.5 系统成组设计需对电芯施加一定的预紧力，新电芯的预紧力范围为 200N~700N，建议的预紧力公差为 100N。

12.5 The group design of the system requires a certain preload to be applied to the cells. The preload range of fresh cell is 200N~700N, and the recommended preload tolerance is ±100N.

12.6 电芯在使用过程中会产生膨胀力，BOL 满电态到 EOL (80%SOH) 满电态膨胀率为 7%，EOL 电芯满电态可承受的力约为 10200N。客户在产品的设计过程中需要考虑与电芯产品配套使用的系统结构

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强度的可靠性，客户需征询卫蓝的建议，并与卫蓝达成一致。

12.6 The product will generate expansion force during use. The expansion rate from BOL@ 100%SOC to EOL@ 80%SOC state is 7%, The expansion force that EOL cells can withstand at 100 %SOC is about 10200 N. Customers need to consider the reliability of the structural strength of the system used in conjunction with the battery cell products in the product design and expansion process, customers need to consult WeLion's advice and reach an agreement with WeLion.

12.7 客户应配置电芯管理系统，严密监控、管理与保护每个电芯。

12.7 Customer shall procure that each product shall be used under the strict monitor, control and protection by the BMS.

12.8 客户最终采用的电芯管理系统方案应符合规格书里的 12.10 条款中的相关规定。

12.8 The BMS that the customer ultimately adopts should be in accordance with the relevant specifications stated in 12.10 in technical specification.

12.9 客户应保存完整的电芯系统使用期限内运转的监测数据，用作产品质量责任划分的参考。

12.9 Customer shall keep relevant records of the BMS monitoring data throughout the entire service life of each product, including keeping record of number of occurrence of rush charge, which will be used in the determination and judgment of any product warranty and liability claim entitlement.

12.10 电芯管理系统需满足以下最基本的检测和控制要求

12.10 The BMS shall include the following monitoring and control features as a minimum requirement.

No.	参数 Parameter	产品规格 Specification	保护动作 Action
12.10.1	第一级充电保护 First overcharge protection	$\geq 4.20V$ (100%SOC)	电芯的电压达到4.20V 时，BMS 申请终止充电。 Stop charging when cell voltage reaches 4.20V.
12.10.2	第二级充电保护 Second overcharge protection	$\geq 4.21V$	当电芯电压达到 4.21V，BMS 强制终止充电。 Stop charging when cell voltage reaches 4.21V.
12.10.3	第三级充电保护 Third overcharge protection	$\geq 4.22V$	当电芯电压达到 4.22V，BMS 强制终止充电，且 BMS 应锁定直到技术人员解决问题。 When the battery voltage reaches 4.22V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.

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12.10.4	第一级放电保护 First over discharge protection	$V_{min1} \leq 3.0V$	当电芯的电压到达 V_{min1} 时, BMS申请终止放电。 Minimize the discharging current when cell voltage reaches V_{min1} .
12.10.5	第二级放电保护 Second over discharge protection	$V_{min2} \leq 2.99V$	当电芯的电压到达 V_{min2} , BMS 强制终止放电 Stop discharging when cell voltage reaches V_{min2} .
12.10.6	第三级放电保护 Third over discharge protection	$V_{min3} \leq 2.98V$	当电芯电压低于 V_{min3} 时, BMS 强制终止放电, 应及时以 0.1C 回充至 20%~40%SOC, 且 BMS 应锁定直到技术人员解决问题。 When the battery voltage is less than V_{min3} , the BMS should be charged back to 20%~40%SOC at 0.1C in time, and the BMS should be locked until technicians solve the problem.
12.10.7	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时, 应由过流保护装置断开电芯电路。 When a short circuit occurs, the battery shall be disconnected by the overcurrent protection device.
12.10.8	过流保护 Over current protection	参考本规格书第4节第5、6条 Refer to Section 4, paragraphs 5 and 6 of this specification	电芯管理系统控制充放电电流在规格范围内。 Control discharge current by BMS to values within specification.
12.10.9	过热保护 Over temperature protection	$T_{max} > 55^{\circ}C$ (充电) $T_{max} > 60^{\circ}C$ (放电) $T_{max} > 55^{\circ}C$ (Charge) $T_{max} > 60^{\circ}C$ (Discharge)	当温度超过本规格书规定时, 终止充电/放电。 Stop charging and discharging when temperature exceeds specification.
12.10.10	第一级充电容量保护 First overcharging capacity protection	100%SOC	当电芯容量达到100%SOC时, BMS强制终止充电。 Stop charging when cell voltage reaches 100%SOC.

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12.10.11	第二级充电容量保护 Second overcharging capacity protection	105%SOC	当电芯容量达到105%SOC时, BMS强制终止充电。 Stop charging when cell voltage reaches 105%SOC.
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备注: 以上 No. 12.10.3、12.10.6、12.10.9、12.10.11 为警示条款, 提请客户注意: 当电芯达到上述任何一项条款描述的指标和参数状态时, 意味着电芯已超出本规格书规定的使用条件, 客户需依“保护动作”及本规格书其他相关规定对电芯采取保护措施, 同时, 卫蓝声明对上述使用状态的电芯质量不承担任何保证责任。

Note: the above No.12.10.3, 12.10.6, 12.10.9, 12.10.11 are the warning clauses, draw the attention of customers: when the battery reaches any of the terms described in the above, it means that the battery has been used beyond the specification. The customer shall take protective measures on the battery in accordance with the protection action and other relevant provisions of this specification. At the same time, WeLion shall not take any responsibility for the quality of the cells mentioned above.

12.11 避免电芯到达过放状态。电芯电压低于 V_{min3} 时, 电芯内部可能会遭到永久性的损坏, 此时卫蓝的产品质量保证责任失效。根据本规格书第 4 节, 当实际放电截止电压低于标准放电截止电压时, 系统内部能耗降低到最小, 并在重新充电之前延长休眠时间。客户需要培训使用者在最短的时间内重新充电, 防止电芯进入二级放电保护状态。

12.11 Avoid overdischarge of the cell. When the cell voltage is lower than V_{min3} , the inside of the cell may be permanently damaged, at which time the product quality assurance responsibility of WeLion is invalid. According to Section 4 of this specification, when the actual discharge cutoff voltage is lower than the standard discharge cutoff voltage, the internal energy consumption of the system is reduced to a minimum and the hibernation time is extended prior to recharging. The customer needs to train the user to recharge in the shortest possible time to prevent the cell from entering the secondary discharge protection state.

12.12 若预计将电芯存放 30 天以上的, 应定期 (建议每隔 3 个月) 按照 5.1、5.2 节中的标准充、放电模式做一次充放电, 然后将 SOC 调整为 20%~40%。

12.12 When the products are intended to be stored for a prolonged period of time (more than one month), conduct one cycle of charging and discharging according to the standard charging and discharging mode in Section 5.1 & 5.2, and then adjust SOC to 20%~40%SOC.

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12.13 电芯避免在本规格书禁止的低温条件下充电(包括标准充电, 快充), 否则可能出现意外的容量降低现象。电芯管理系统应依照最小的充电温度进行控制。禁止在低于本规格书规定的温度条件下充电。

12.13 Batteries should avoid charging at low temperatures prohibited by this Technical Specification (including standard charging, fast charging), otherwise accidental capacity reduction may occur. Battery management system should be controlled according to the minimum charging temperature. It is forbidden to charge under the temperature stipulated in this technical specification.

12.14 电箱设计中应充分考虑电芯的散热问题, 避免由于箱体散热设计问题导致的电芯过热损坏。

12.14 The design of the electric box must fully consider the heat dissipation problem of the cell, to avoid overheating and damage to cells caused by design issues with the electrical box.

12.15 电芯模组设计中应保证电芯完整大面受力均匀, 避免影响的电芯循环寿命。

12.15 In the design of the battery module, it should be ensured that the whole large surface of the cell is evenly stressed, to avoid affecting the cycle life of cells.

12.16 电箱设计中应充分考虑电芯的防水、防尘问题, 电箱必须满足 UL 和 IEC 有关标准规定的防水、防尘等级。避免由于防水、防尘设计缺陷导致电芯损坏 (如腐蚀、生锈等)。

12.16 The design of the electric box should fully consider the waterproof and dustproof problems of the cell, and the electric box must meet the waterproof and dustproof grades stipulated by UL and IEC. Avoid core damage due to waterproof and dustproof design defects (such as corrosion, rust, etc.).

12.17 卫蓝出货时会根据双方协商的配组要求进行配组, 并进行标识和出货。不同标识的电芯不能混用, 若有特殊需求可与卫蓝沟通详细解决方案。

12.17 WeLion products are shipped in accordance with integration specifications agreed by both parties, and label the shipment accordingly. Cells with different markings cannot be mixed. Any irregular requirements can be negotiable with WeLion. It is forbidden to mix different P/N batteries in the same battery system, otherwise, WeLion must not be responsible for quality assurance.

12.18 电芯在成组后, 当外部发生短路时, 应确保外部短路保护装置首先断开电池回路, 短路时不能造成电芯损坏, 多个电芯并联时推荐不超过 4 个电芯以上并联使用。

12.18 In the battery module, when the external short circuit occurs, it should be ensured that the external short circuit device first disconnects the battery circuit, and the short circuit can not cause damage to the cell, and it is recommended that no more than 4 cells be used in parallel when multiple cells are in parallel.

12.19 电芯在成组后, 当电芯搭配其他电子元件使用时, 应注意远离静电场使用, 确保电子元件与电芯

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的正常运行。

12.19 In the battery module, when the cell is used with other electronic components, attention should be paid to keep away from the electrostatic field to ensure the normal operation of the electronic components and the cell.

12.20 电芯在成组时，应确保外部压力不会造成电芯损坏，应确保电芯大面受力均匀，应避免电芯大面应力集中。模组成组时应考虑变形后各零部件位置关系，避免非绝缘部件划伤铝塑膜。

12.20 In the battery module, it should be ensured that the external pressure will not cause damage to the cell, it should be ensured that the force on the large surface of the cell is uniform, and the stress concentration on the large surface of the cell should be avoided. When forming the mold, the position relationship of the parts after deformation should be considered to avoid non-insulated parts scratching the aluminum-plastic film.

12.21 电芯在成组时，与电芯接触的外部材料，应确保不会腐蚀电芯。

12.21 In the battery module, the external material in contact with the cell should ensure that it will not corrode the cell.

12.22 电芯在成组时，应确保其他配件或外部工装不会造成电芯损坏漏液。

12.22 In the battery module, ensure that other accessories or external tooling will not cause damage to the cell leakage.

12.23 电芯在成组时，应确保外部压力均匀分布于电芯大面，成组预紧压力不超过 800N（电芯循环预紧力），压装部件边缘不会造成电芯局部变形或损坏。

12.23 In the battery module, it should be ensured that the external pressure is evenly distributed on the large surface of the cell, the group preload pressure does not exceed 800N(cell cyclic preload force), and the edge of the pressed part will not cause local deformation or damage to the cell.

12.24 电芯在成组时，应确保电芯在 $\pm X/\pm Y/\pm Z$ 方向上有充分约束。

12.24 In the battery module, ensure that the cell is fully constrained in the $\pm X/\pm Y/\pm Z$ direction.

12.25 电芯在成组时，应具备热管理功能，确保电芯的散热，电芯极耳及 busbar 温度 $\leq 60^{\circ}\text{C}$ （电芯承受最高温度）。

12.25 In the battery module, the thermal management function should be provided to ensure the heat dissipation of the cell, the cell pole and the busbar temperature $<60^{\circ}\text{C}$ (the maximum temperature of the cell).

12.26 电芯在成组时，禁用高压带电部件直接接触电芯进行加热。

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12.26 In the battery module, do not heat by contact high-voltage live parts directly with the battery cell.

12.27 电芯在成组时，热管理系统应能正确测量电芯的温度。

12.27 In the battery module, the thermal management system should be able to correctly measure the temperature of the cell.

12.28 BMS 应具备如下性能：

12.28The BMS should have the following functions：

序号 Serial number	项目 item	性能 property
1	BMS 单体电压采样范围 BMS cell voltage sampling range	0V-5V
2	BMS 单体电压采样精度 BMS cell voltage sampling accuracy	$\leq \pm 5\text{mV}@0\sim 60^{\circ}\text{C}$ $\leq \pm 10\text{mV}@-40^{\circ}\text{C}-0^{\circ}\text{C}$ or $60^{\circ}\text{C}-85^{\circ}\text{C}$
3	BMS 电流采样精度 BMS current sampling accuracy	$\leq \pm 1\%\text{FSR}$
4	BMS 温度采样精度 BMS temperature sampling accuracy	$\pm 2^{\circ}\text{C}$
5	BMS 温度采样范围 BMS temperature sampling range	- $40^{\circ}\text{C}-85^{\circ}\text{C}$
6	BMS SOC 估算精度 BMS SOC estimation accuracy	BEV $\leq 5\%$, PHEV10%
7	BMS SOH 估算精度 BMS SOH estimation accuracy	$\leq 8\%$

12.29 BMS 应确保电芯的充放电电流满足规格书要求，应根据 BMS 自身采样和估算的精度，调整允许应用的充放电电流值，BMS 应具备过压，欠压，过温，过流等保护功能，确保电芯应用安全。

12.29 BMS shall ensure that the charging and discharging current of the cell meets the requirements of the specification, and adjust the allowable charging and discharging current value according to the accuracy of BMS's own sampling and estimation. BMS should have over-voltage, under-voltage, over-temperature, over-current and other protection functions to ensure the safety of the battery cell application.

12.30 在模组或 Pack 生产过程中，不能有金属异物短接极耳。

12.30 During the module or Pack production process, there should be no metal foreign body short nipple.

12.31 在模组或 Pack 生产过程中，当电芯极耳与外部集流体（例如 busbar）采用激光焊机时，在焊印

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轨迹不能超出极耳焊接区域。焊接时,应保证电芯极耳温度不能过高,软包电芯极耳塑胶的温度 $\leq 120^{\circ}\text{C}5\text{s}$ 。

焊接完成后,极耳应有具有一定的缓冲设计,避免在振动和机械冲击等使用工况中对电芯的极耳产生拉扯力。

12.31 In the module or Pack production process, when the electrode and the external collector (such as busbar) using a laser welding machine, the welding track can not exceed the electrode welding area. When welding, it should be ensured that the temperature of the battery cell ear cannot be too high. Pouch cell pole ear plastic temperature $\leq 120^{\circ}\text{C}$, 5s. After the welding is completed, the pole should have a certain buffer design to avoid pulling force on the pole of the cell in vibration and mechanical shock.

12.32 在模组或 Pack 生产过程中,应确保扫描枪读取电芯二维码,并记录和保存电芯数据,确保有追溯系统。

12.32 In the module or Pack production process, it should be ensured that the scanning gun reads the cell QR code, and records and saves the cell data to ensure that there is a traceability system.

12.33 当由于外部应力导致电芯漏液时,应确保模组或 Pack 产品的高低回路不会短路。

12.33 When the cell leaks due to external stress, ensure that the high-low circuit of the module or Pack product is not short-circuited.

12.34 如果客户违反以上电芯应用安全要求和电芯规格书要求,导致电芯容量跳水、析锂、漏液、过热、冒烟、或起火爆炸等,不承担质量保证责任。

12.34 If the customer violates the above cell application safety requirements and cell specification requirements, resulting in cell capacity diving, lithium analysis, leakage, overheating, smoking, or fire and explosion, do not assume the responsibility for quality assurance.

12.35 电芯在成组时,电芯之间、电芯与结构件之间应具有绝缘介质。其最小电气距离和爬电距离应满足相关标准要求。

12.35 In the battery module, there should be an insulating medium between the cells and between the cells and the structural parts. The minimum electrical distance and creepage distance shall meet the requirements of relevant standards.

12.36 以上供模组/系统设计参考,客户采用的任何模组/系统或其他应用场景的方案设计,都应该做充分的验证并取得相应的第三方认证(如强检),否则出现的模组/系统或其他应用场景的质量问题/损失,卫蓝

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不承担任何责任。

12.36 The above is for module/system design reference. Any module/system or other application scenario design adopted by the customer should undergo sufficient verification and obtain corresponding third-party certification (such as mandatory inspection). Otherwise, Weilan will not be responsible for any quality problems/losses in the module/system or other application scenario.

13. 文件有效期 Valid Periods

本文件自发布之日起至下次修正日止。

This document is valid since the date of publication until the date of next revision.

14. 保密 Confidentiality

本规格书在没有得到北京卫蓝新能源科技股份有限公司的许可时，不能向第三方泄露，禁止复印或转载，不能对电芯进行拆解。

This specification cannot be leaked to third party, copied and reprinted without the permission of Beijing WeLion New Energy Technology Co., Ltd. All the batteries cannot be disassembled.

15. 发布日期 Publication Date

2024 年 06 月 22 日。

June 22, 2024.

16. 警告事项及注意事项 Warnings and Precautions

16.1 不要将电池投入火中或加热；

16.1 Do not throw the cell into fire or heating；

16.2 不要将电池分解拆散；

16.2 Do not disassemble the cell；

16.3 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；

16.3 It is strictly forbidden to immerse the cell in seawater or water. It should be placed in a cool and dry

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Beijing WeLion New Energy Technology Co., Ltd

固态锂电池 SHP270-17 产品规格书

Specification of Solid-state Lithium-ion Battery SHP270-17

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environment when it is stored;

16.4 禁止将电池放在热源旁，如火、加热器等；

16.4 Do not place the cell near the heat, such as fire, heaters, etc.;

16.5 充电时请选用锂离子电池专用充电器；

16.5 Please use a special charger for lithium-ion battery when charging;

16.6 严禁颠倒正负极使用电池；

16.6 It is strictly forbidden to reverse the positive and negative tabs to use the battery;

16.7 严禁将电池直接插入电源插座；

16.7 It is strictly forbidden to plug the cell into a power outlet directly;

16.8 禁止用金属直接连接电池正负极短路；

16.8 It is forbidden to use metal to directly connect the positive and negative tabs of the cell to short circuit;

16.9 禁止将电池与金属（如发夹、项链等）一起运输或贮存；

16.9 It is forbidden to transport or store batteries together with metals (such as hairpins, necklaces, etc.);

16.10 禁止敲击或抛掷、踩踏电池等；

16.10 It is forbidden to knock or throw, step on the cell, etc.;

16.11 禁止直接焊接电池和用钉子或其它利器刺穿电池；

16.11 It is forbidden to weld or pierce cell with nails or other sharp objects;

16.12 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；

16.12 It is forbidden to use or store the battery in high temperature (in the hot sun or in a very hot car), otherwise it may cause the battery to overheat, catch fire or fail to function, and shorten its lifespan;

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16.13 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；

16.13 It is forbidden to use it in places with strong static electricity and strong magnetic fields, otherwise it will easily damage the safety protection device and bring unsafe hidden dangers;

16.14 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；

16.14 If the battery leaks and the electrolyte drops into the eyes, do not rub the eyes but wash in time, and go to hospital for treatment immediately;

16.15 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；

16.15 If any abnormality such as emitting an odor, emitting heat, discoloration and deformation occur during use, storage or charge, please remove the cell from the device or charger and do not use it anymore;

16.16 废弃电池应用绝缘纸包住电极以防起火、爆炸；

16.16 The tabs of disused cell should be covered with insulating paper to prevent fire and explosion;

16.17 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。

16.17 If the battery tab is dirty, it should be wiped with a dry cloth before use, otherwise it may cause poor contact and function loss.