锂电池 SHS165-280

产品规格书

Specification of lithium-ion battery SHS165-280

电芯型号 Cell Model： AL71173207-280Ah

电芯容量 Cell Capacity：280Ah

公司地址：淄博市高新区民祥路 2999 号
Address：No. 2999, Minxiang Road, High tech Zone, Zibo City.

目 录

Table of Contents

1. 适用范围 Scope

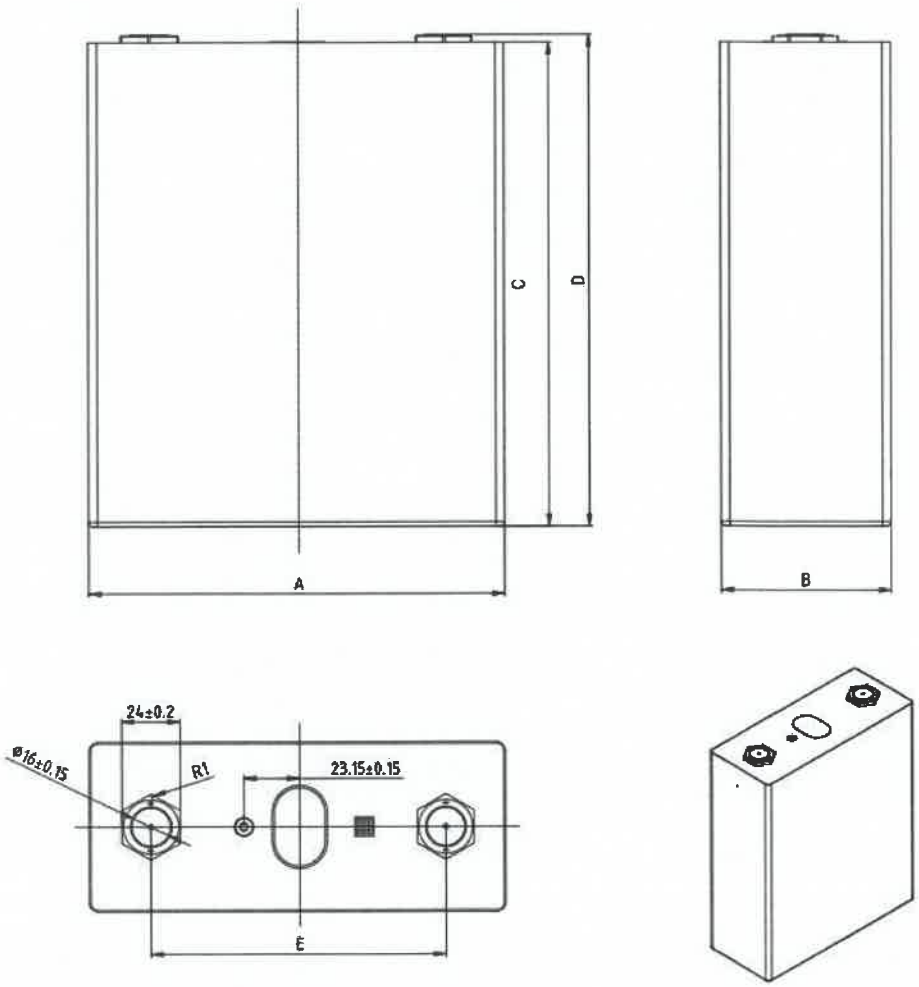
本产品规格书详细描述了卫蓝海博（淄博）新能源科技有限公司（以下简称“卫蓝海博”）生产的 280Ah 混合固液锂离子电芯（能量型）新电芯状态的产品性能指标以及产品使用条件。

The purpose of this document is to specify the specifications and usage conditions of 280Ah hybrid solid-liquid lithium-ion (energy type) fresh cell for energy storage system to be supplied by Welion Hyper(Zibo) New Energy Technology Co., Ltd. (Hereinafter referred to as "Welion Hyper")

2. 产品型号 Cell model

AL71173207-280Ah

3. 产品尺寸 Product dimension



项目代码 Code	项目名称 Items	尺寸 Dimension
A	宽度 Width	174.2±0.8 mm
B	厚度 Thickness	71.7±0.8 mm （40%SOC，300±20kg）
C	高度 Height（肩高）	204.3±0.8mm
D	高度 Height（总高）	207.1±0.8mm
E	极柱中心距 The distance of center to center	123.0±0.2mm

4. 产品规格 Product specification

No.	项目 Item		技术指标 Criteria
1	标称容量 Rated capacity		280Ah（0.5P）
2	标称能量 Nominal Energy		896Wh（0.5P）
3	标称电压 Rated voltage		3.2V（0.5P）
4	充电终止电压 Charge cut-off voltage		3.65V
5	放电终止电压 Discharge cut-off voltage		2.5V（＞0℃），2.0V（≤0℃）
6	充电方法 Charge method	标准充电 Standard charge	25℃，0.5P 恒功率充电至 3.65V。 25℃, 0.5P CP to 3.65V.
7	放电方法 Discharge method	标准放电 Standard discharge	25℃，0.5P 恒功率放电至 2.5V。 25℃, 0.5P DP to 2.5V.
		最大功率放电 Maximum power discharge	25℃，1P 恒功率放电至 2.5V。 25℃, 1P DP to 2.5V.
8	常温循环寿命 Room temperature cycle life	容量保持率 Capacity retention	25℃，循环次数≥8000@70%标称容量保持率（0.5P/0.5P，初始夹紧力 300±20kgf）。 25℃, Cycle number ≥8000@70% nominal capacity retention（0.5P/0.5P，Initial clamping force 300±20kgf）.
9	高温循环寿命 High temperature cycle Life	容量保持率 Capacity retention	45℃，循环次数≥3000@70%标称容量保持率（0.5P/0.5P，初始夹紧力 300±20kgf）。 45℃, Cycle number ≥3000@70% nominal capacity retention（0.5P/0.5P，Initial clamping force 300±20kgf）.
10	工作温度 Operating temperature		充电：0℃~60℃；放电：-30℃~60℃。 Charge: 0℃~60℃; Discharge: -30℃~60℃.
11	储存温度 Storage temperature		短期存储（1 个月）：-30℃～60℃ 长期存储（6 个月）：-20℃～40℃ Short-term storage（1 month）：-30℃～60℃

		Long-term storage（6 months）：-20℃～40℃
12	存储湿度 Storage humidity	≤85%RH
13	能量密度 Energy Density	重量比能量 Weight energy density: ≥165Wh/kg （0.5P/0.5P） 体积比能量 Volume energy density: ≥340Wh/L （0.5P/0.5P）
14	交流内阻 AC impedance	0.17±0.05mΩ（Ac. 1kHz 25℃，40%SOC）
15	直流内阻 DC impedance	0.40±0.05mΩ（Dc. 400A 10s，25℃，25%SOC）
16	重量 Weight	5.5±0.1kg
17	出货 SOC Shipped SOC	40%SOC
18	自放电 Self discharge	≤3%/月（40%SOC-25±2℃存储） ≤3%/month（40%SOC-25±2℃ storage）
19	应用海拔 Operating elevation	≤5000m

5. 电性能测试 Electrical performance test

5.1 标准充电 Standard Charge

25±2°C，0.5P (448W) 恒功率充电至 3.65V，静置 30min。

At 25±2°C, charge the cell at 0.5P (448W) constant power till the voltage reaches 3.65V, rest 30min.

5.2 标准放电 Standard Discharge

25±2°C，0.5P (448W) 恒功率放电至 2.5V，静置 30min。

At 25±2 °C, discharge the cell at 0.5P (448W) constant power till the voltage drops to 2.5V, rest 30min.

5.3 电性能参数 Electrical Performance

No.	项目 Item	性能参数 Performance	测试方法 Test methods
1	容量 Capacity	≥280Ah	按照 5.1、5.2 进行标准充、放电，循环 4 次，记录放电容量，取后三次均值。 Charge and discharge according to standard methods of 5.1 and 5.2, cycle 4 times, and record the discharge capacity, take the last three averages.
2	能量 Energy	≥896Wh	按照 5.1、5.2 进行标准充、放电，循环 4 次，记录放电能量，取后三次均值。 Charge and discharge according to standard methods of 5.1 and 5.2, cycle 4 times, and record the discharge energy, take the last three averages.
3	直流内阻 DC impedance	0.4±0.05mΩ（40%SOC，400A discharge 10s）	1）按照 5.1、5.2 进行标准充放电，记录初始放电容量； Charge and discharge according to standard methods of 5.1 and 5.2, and record the initial discharge capacity; 2）按照 5.2 进行放电，然后采用 0.5P 充电至 40%SOC，搁置 1h； Discharge the cell according to 5.2, then charge at 0.5P constant power to 40% SOC, rest 1h; 3）脉冲放电，25°C，I=400A，脉冲放电 10s，下限电压 2.5V。 At 25 °C, pulse discharge 10s at 400A constant current

			with a low-limited voltage of 2.5V.
4	自放电 Self-discharge	≤3%/month (25℃, 40%)	1）按照 5.1、5.2 进行标准充放电，记录初始放电容量； Charge and discharge according to standard methods of 5.1 and 5.2, and record the initial discharge capacity; 2）按照 5.2 进行放电，然后采用 0.5P 充电至 40%SOC； Discharge the cell according to 5.2, then charge at 0.5P constant power to 40% SOC; 3）在测试温度 25℃搁置一个月； Keep in storage for one month at 25℃; 4）按照 5.1、5.2 标准充放电方法进行容量测试，计算容量保持率和恢复率。 Charge and discharge according to standard methods of 5.1 and 5.2, calculate capacity retention and recovery.
5	常温循环寿命 Room temperature cycle life	循环次数≥8000@70%容量保持率 Cycle number ≥ 8000@70% capacity retention	1）按照 5.1、5.2 进行标准充放电，记录初始放电容量； Charge and discharge according to standard methods of 5.1 and 5.2, and record the initial discharge capacity; 2）初始预紧力 300±20kgf，进行 0.5P 充电/0.5P 放电循环； The cell cycle at 0.5P/0.5P with an initial pressure of 300±20kgf; 3）按照 5.1、5.2 标准充放电方法进行容量测试，容量保持率低于 70%时停止测试。 Charge and discharge according to standard methods of 5.1 and 5.2, record capacity retention till the capacity retention is less than 70%.
6	高温循环寿命 High temperature cycle life	循环次数≥3000@70%容量保持率 Cycle number ≥ 3000@70%	1）按照 5.1、5.2 进行标准充放电，记录初始放电容量； Charge and discharge according to standard methods of 5.1 and 5.2, and record the initial discharge capacity; 2）在 45±2℃下，初始预紧力 300±20kgf，进行 0.5P 充电

		capacity retention	/0.5P 放电循环； At 45±2 ℃, the cell cycle at 0.5P/0.5P with an initial pressure of 300±20kgf; 3）按照 2）充放电方法进行容量测试，容量保持率低于 70%时停止测试。 Perform the capacity test according to the 2) charge and discharge method, record capacity retention till the capacity retention is less than 70%.
7	高温放电容量 High temperature discharge capacity	≥280Ah	1）按照 5.1 进行标准充电； Charge according to standard methods of 5.1; 2）在 55±2℃下，静置 4h，0.5P (448W) 恒功率放电至 2.5V，记录放电容量。 At 55±2 ℃, rest 4h, discharge the cell at 0.5P (448W) constant power till the voltage drops to 2.5V, and record the discharge capacity.
8	低温放电容量 Low temperature discharge capacity	≥224Ah	1）按照 5.1 进行标准充电； Charge according to standard methods of 5.1; 2）在-20±2℃下，静置 24h，0.5P (448W) 恒功率放电至 2.0V，记录放电容量。 At -20±2 ℃, rest 24h, discharge the cell at 0.5P (448W) constant power till the voltage drops to 2.0V, and record the discharge capacity.

备注： 进行高低温测试时，应避免高低温箱出风口与电池处于对流直吹状态。

Note: When conducting high and low temperature tests, the battery should avoid being in the state of direct convection blowing at the air outlet of the high and low temperature box.

5.4 安全性能 Safety performance

No.	项目 Item	性能参数 Performance	测试方法 Test methods
1	过充电 Overcharge	不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）常温静置 1h； Rest for 1h at room temperature; 3）140A（0.5C）充电至终止电压的 1.5 倍或时间达到 1h； Charge at 140A（0.5C）till 1.5 times the termination voltage or the time reaches 1h; 4）观察 1h。 Observation for 1 hour.
2	过放 Over Discharge	不漏液、不冒烟、不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No leakage, no smoke, no fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）按照 5.2 进行标准放电； Discharge according to standard methods of 5.2; 2）常温静置 1h； Rest for 1h at room temperature; 3）140A（0.5C）放电至电压达到 0V 或时间达到 1h； Discharge at 140A（0.5C）till the voltage reaches 0V or the time reaches 1h; 4）观察 1h。 Observation for 1 hour.
3	短路 Short-circuit	不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No fire, no explosion,	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC;

			rupture should not occur outside of the explosion valve or pressure relief point.	2）在 25±5℃下，搁置 1h； At 25±5℃, rest 1h； 3）短路其正负极（外部电阻≤1mΩ），短接 10min； Short circuit its positive and negative poles (external resistance ≤ 1mΩ), short circuit for 10min; 4）观察 1h。 Observation for 1 hour.
4	过载 Overload		不漏液、不冒烟、不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No leakage, no smoke, no fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）按照 5.2 进行标准放电； Discharge according to standard methods of 5.2; 2）以 1792W（2P）恒功率充电至 3.65V，静置 10min； 1792W（2P） constant power charging to 3.65V, rest 10min; 3）以 1792W（2P）恒功率放电至 2.5V； 1792W（2P）constant power discharging to 2.5V; 4）观察 1h。 Observation for 1 hour.
5	跌落 Drop		不冒烟、不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No smoke, no fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）正极或负极端子朝下； the positive or negative terminals facing down ; 3）从 1.5m 的跌落高度自由落体跌落于水泥地面； Conduct the free-drop experiments of the battery onto the concrete floor from a 1.5m-height; 4）观察 1h。

			Observation for 1 hour.
6	挤压 Crush	不漏液、不冒烟、不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No leakage, no smoke, no fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）挤压方向：垂直于电池单体极板方向施压； Crush the cell at the perpendicular direction; 3）75mm 半圆柱体； 75mm half cylinder; 4）挤压程度：以 5±1mm/s 固定挤压速度挤压至挤压压力大于 50kN，保持 10min； Crush degree: Crush at a fixed crush speed of 5±1mm/s until max force 50 kN, rest for 10 min; 5）观察 1h。 Observation for 1 hour.
7	热失控 Thermal runaway	不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂，热失控时电池表面温度应＞90℃ No fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point, the surface temperature should be > 90℃ when the battery is thermally runaway	1） 电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2） 加热片功率：≥1000W； Heating sheet power: ≥1000W; 3） 140A（0.5C）恒流充电，同时开启加热； Charge at 140A（0.5C）constant current and turn on the heating at the same time; 4）电池发生热失控或监测点温度达到 300℃或时间达到 4h 时，停止充电和加热； the battery is out of thermal control or the temperature at the monitoring point reaches 300℃ or the time reaches 4h, and stop charging and

				heating; 5）观察 1h。 Observation for 1 hour.
	8	绝热温升 Adiabatic temperature rise	不起火、不爆炸，表面温度≤电池高温报警温度时，温升速率＜0.02℃/min，不应在防爆阀或泄压点之外的位置发生破裂 No fire, no explosion, when the surface temperature ≤the alarm temperature of the battery, the temperature rise rate < 0.02℃/min, rupture should not occur outside of the explosion valve or pressure relief point.	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）当电池表面温度达到 40℃时，静置 5h； When the surface temperature of the battery reaches 40℃, let it stand for 5h; 3）继续加热样品至表面温度达到 45℃时，静置 1h，然后恒定当前温度 20min； Continue to heat the sample until the surface temperature reaches 45℃, let it stand for 1h, and keep the current temperature constant for 20min; 4）以 5℃为步长逐次递增电池表面温度至 130℃，重复步骤 3，完成后停止加热； Increase the surface temperature of the battery to 130℃ in 5℃ steps, repeat step 3, and stop heating when finished; 5）观察 1h。 Observation for 1 hour.
	9	热箱 Hotbox	不起火、不爆炸，不应在防爆阀或泄压点之外的位置发生破裂 No fire, no explosion, rupture should not occur outside of the explosion valve or pressure relief point.	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）温度箱升温速率 5℃/min； Heating rate: 5℃/min; 3）10℃一个台阶，每个温度台阶静置 1h，电池由室温升温至 160℃；

			10℃ step, each step soaking at least 1 hour till The battery is heated from room temperature to 160℃; 4） 保持 30min，停止加热； Hold at this temperature for 30min, stop heating; 5）观察 1h。 Observation for 1 hour.
10	针刺 Nail Penetration	不起火，不爆炸 No fire, no explosion	1）电芯用 5.1 标准充电方法充至满电； Charge according to standard method of 5.1 to 100%SOC; 2）常温静置 1h； Rest for 1h at room temperature; 3）使用直径 3~8mm 针(45°针尖)，以 25±5mm/s 的速度从垂直于电极极板的方向贯彻电池几何中心； Penetrate the geometric center of the battery using a 3~8mm-diameter steel nail (45° nail tip) from a direction perpendicular to the battery plate at a speed of 25±5mm/s; 4）停留并观察 1h。 Rest and observe for 1h.

备注 Note：

1)上述安全测试项目方法、标准参考：GB/T 36276-2023。上述安全测试除挤压、跌落外，剩余测试项目电池皆需要进行夹具固定，夹具初始加紧力为 300±20kgf，夹具安装操作流程可与卫蓝海博进行沟通确认；

The above security test items are as follows:GB/T 36276-2023. In addition to squeezing and dropping, the batteries of the remaining test items need to be fixed with a splint, and the initial clamping force of the splint is 300±20kgf, the operation process of splint installation can be communicated and confirmed with Welion Hyper.

2)客户进行除上述列表内安全测试外的其它测试或者参考其他标准，测试前需与卫蓝海博确认具体测试流程与注意事项，未经卫蓝海博书面确认反馈的安全测试项目及测试方法，卫蓝海博不保证电池的安全测试结果。

Customers who conduct other tests in addition to the safety tests in the above list or refer to other standards need to confirm the specific test procedures and precautions with Welion Hyper before testing, Without the written confirmation and feedback of the safety test items and test methods of Welion Hyper, Welion Hyper does not guarantee the safety test results of the battery.

5.5 膨胀力 Expansion force

膨胀力 Expansion force	BOL	≤3000N
	EOL（SOH80%）	≤20000N
	EOL（SOH70%）	≤27000N
	EOL（SOH60%）	≤50000N

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. 标准测试条件 Standard test condition

除非特别说明，本规格书中所有测试均在以下条件下进行：

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

—温 度 Temperature：25 ± 2 °C

—湿 度 Humidity：≤ 85%RH

—大气压 Atmospheric pressure：86 ~ 106 kPa

—初始预紧力范围 Initial preload force：300±20 kgf

客户进行其他测试或者参考其他标准测试前需与卫蓝海博确认具体测试流程与注意事项。

Customers need to confirm the testing process and precautions with Welion Hyper before conducting other tests.

8. 包装及运输 Package and transportation

8.1 电池的包装应符合防潮防震的要求。

The package of the battery should satisfy the requirements of moisture and shock-proof.

8.2 包装箱内应装入随同产品提供的文件：

The product documents shall be packed in the box:

—装箱单（指一批多箱包装时）；Packing list (refer to a batch of multiple boxes);

—产品检验报告。Product test report.

8.3 运输过程建议电芯荷电状态低于 40%。

It is advisable to maintain the battery cell's state of charge below 40% during transportation.

9. 标识 Identification

9.1 单体电池产品上应有下列标识：Every cell should have the followingcharacters：

—产品型号 Product model

—额定容量 Rated capacity

—极性符号+、- Polarity + 、-

—产品条码（信息包含产品型号、批号信息）Product barcode (including product model and lot No. information)

9.2 包装箱外壁应有下列标志：Outside the packing box should have the following characters：

—产品名称、产品型号、产品批号、产品等级、数量、物料编码

Product name, model, lot No., leval, quantity and material code

—标明防潮、不准倒置、轻放等标志

Marked with moisture-proof, no inversion, light handling and other signs

—制造商或商标

Manufacturer or trademark

10. 存储及其他事项 Storage and others

10.1 长期储存 Long time storage

长期储存的电池（超过3个月）须置于干燥、凉爽处，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%。

For long-term storage (more than 3 months) the battery should be stored in a dry and cool place, 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 every 3 months 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 Welion Hyper(Zibo) New Energy Technology Co., Ltd.

11. 保质期 Period of Warranty

质保要求按照甲方和卫蓝海博双方约定为准。

The warranty requirements shall be subject to the agreement between Party A and Welion Hyper.

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，卫蓝海博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 Hyper is not responsible for the economic losses caused by the failure of the battery cell 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；

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℃~60℃；放电 -30℃~60℃；

Operating environment temperature range : charge 0℃~60℃; discharge -30℃~60℃;

12.3 出货态电芯短期储存温度范围(1 个月内)：-30℃~60℃；

Shipped cells short term storage temperature range (within 1 month): -30℃~60℃;

12.4 海拔：≤5000m；

Altitude：≤5000m;

12.5 相对湿度：≤85%；

Relative humidity：≤85%;

12.6 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建议为 500N~5000N，公差为±200N；

The group design of the system requires a certain pre tightening force to be applied to the cells . The pre tightening force range of fresh cell is 500N~5000N, and tolerance is ±200N;

12.7 电芯在使用过程中会产生膨胀力，电芯 0%~100%SOC 呼吸膨胀率为 3%。电芯在 15mm 钢板测试条件下，EOL（80%SOH）电芯满电态可承受的力约为 20000N，衰减至 60%时膨胀力约为 50000N。客户在产品设计过程中需要考虑结构强度可靠性，建议电芯成组预留 1.5~2.0mm 的 Gap，或者客户征询卫蓝海博的建议，并与卫蓝海博达成一致；

The product will generate expansion force during use. The expansion rate during the charging and discharging process of battery cells from 0%~100%SOC is 3%. While restrain the cell with 15mm steel plate, the expansion force that EOL cells can withstand at 80%SOC is about 20000N, the expansion force will reach to about 50,000N by the time cell degrades to 60% SOH. The client needs to consider structural integrity and reliability during product design, and it is advised to keep 1.5~2.0mm gap in between of the cell when integrating cells into the system, Or the customer asks Welion Hyper for advice and reach an agreement with Welion Hyper;

12.8 客户应配置电芯管理系统，严密监控、管理与保护每个电芯；

Customer shall procure that each Product shall be used under the strict monitor, control and protection by the BMS;

12.9 客户最终采用的电芯管理系统方案应符合规格书里的 12.11 条款中的相关规定；

The BMS that the customer ultimately adopt s should be in accordance with the relevant specifications stated in 12.11 in technical specification;

12.10 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；

Customer shall keep relevant records of the BMS monitoring data throughout the entire service life of each Product , which will be used in the determination and judgment of any product warranty and liability claim entitlement;

12.11 电芯管理系统需满足以下最基本的检测和控制要求；

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

12.11.1	第一级充电保护 First overcharge protection	3.65V (100%SOC)	当电芯电压达到3.65V，BMS 申请终止充电。 Stop charging when cell voltage reaches 3.65V.
12.11.2	第二级充电保护 Second overcharge protection	≥3.7V	当电芯电压达到3.7V，BMS 强制终止充电。 Stop charging when cell voltage reaches 3.7V.
12.11.3	第三级充电保护 Third overcharge protection	≥3.8V	当电芯电压达到3.8V，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 3.8V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.
12.11.4	第一级放电保护 First over discharge protection	V_{min1}=2.5V(T＞0℃) V_{min1}=2.0V(-30℃＜T≤0℃)	当电芯的电压到达V_{min1}，BMS申请终止放电。 Minimize the discharging current when cell voltage reaches V_{min1}.
12.11.5	第二级放电保护 Second over discharge protection	V_{min2}=2.3V(T＞0℃) V_{min2}=1.9V(-30℃＜T≤0℃)	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}.
12.11.6	第三级放电保护 Third over discharge protection	V_{min3}=2.0V(T＞0℃) V_{min3}=1.8V(-30℃＜T≤0℃)	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 10%~30%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 10%~30%SOC at 0.1C in time, and the BMS should be locked until technicians solve the problem.
12.11.7	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.

12.11.8	过流保护 Over current protection	不允许超过第4节充放电方法规定的电流 It is not allowed to exceed the current specified in the charging and discharging methods in Section 4	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.
12.11.9	过热保护 Over temperature protection	T_{max}＞60℃	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.

备注：以上 No. 12.11.3、12.11.6、12.11.9 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，卫蓝海博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.12.11.3, 12.11.6, 12.11.9 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 Hyper shall not take any responsibility for the quality of the cells mentioned above;

12.12 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，此时卫蓝海博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；

Prevent draining any Product down to over discharge state. A Product may be permanently damaged internally when the cell voltage is lower than V_{min3} and therefore shall be strictly prohibited, failing what Welion Hyper's warranties under the Contract shall cease to apply, thereby releasing the Welion Hyper from any liability in connection therewith. After discharge cut-off in accordance with paragraph 4, internal power consumption of the system should be reduced to a minimum to prolong the idle time before recharge. Customer undertakes to educate the users of the Products or other parties who may come to handle the Products to recharge the cells at minimum time intervals to prevent reaching the second over-discharge state;

12.13 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%；

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 every 3 months according to the standard charging and discharging mode in Section 5.1 & 5.2, and then adjust SOC to 20%~40%SOC;

12.14 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；

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;

12.15 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；

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

12.16 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；

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 battery cells;

12.17 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）；

The design of the electric box must fully consider the waterproof and dustproof problems of the cells. The electric box must meet the waterproof and dustproof grade stipulated by the relevant national standards. To avoid damage to battery cells due to defects in waterproof and dust-proof design, such as corrosion and rust;

12.18 卫蓝海博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海博沟通详细解决方案，否则卫蓝海博不承诺质量保证；

Welion Hyper 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 Hyper. otherwise, Welion Hyper must not be responsible for quality assurance;

12.19 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，卫蓝海博不承担任何责任。

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, Welion Hyper 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**卫蓝海博（淄博）新能源科技有限公司**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 Welion Hyper(Zibo) New Energy Technology Co., Ltd. All the batteries cannot be disassembled.

15. 发布日期 Publication date

2024 年 6 月 20 日。

June 20th, 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；

Do not throw the cell into fire or heating;

16.2 不要将电池分解拆散；

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；

It is strictly forbidden to immerse the cell in seawater or water. It should be placed in a cool and dry environment when it is stored;

16.4 禁止将电池放在热源旁，如火、加热器等；

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；

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

16.6 严禁颠倒正负极使用电池；

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；

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；

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；

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；

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；

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；

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;

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；

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；

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；

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；

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

16.17 如果电池极耳弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效；

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;

16.18 电芯的使用期限是有限的。客户应该建立有效的跟踪系统监测并记录每个使用期限内电芯的内阻和容量。内阻以及容量的测量方法和计算方法需要客户和卫蓝海博共同讨论和双方同意。当使用中的电芯的内阻超过这个电芯最初内阻的 180%或标准放电容量小于等于标称容量 70%(25℃)，应停止使用电芯。违反该项要求，将免除卫蓝海博依据产品销售协议以及本技术协议所应承担的产品质量保证责任。

This cell is designed to service with a finite life time. The customer shall develop and implement an active tracking system to monitor and record impedance of each Product in its entire service life. Welion Hyper and its customer shall come into agreement about internal resistance and capacity measurement methods, Welion Hyper and/or its customer shall stop using any of the Products when its resistance exceeds 180% of its internal resistance or it standard discharge capacity fading to 70% of typical capacity @25°C . Failure to comply with this requirement shall render Welion Hyper's warranties under the contract inapplicable, thereby releasing Welion Hyper from any liability in connection therewith.

文 件 更 改 履 历 表

File change history

更改日期 Change date	更改后版本 Changed version	文件更改单号 File change order number	变更内容描述 Description of changes	更改人 Changed by
2023.05.31	V1.0		初版发行 First edition release	陈坤
2023.09.10	V1.1		1、新增常温循环寿命 8000 次≥70%SOH 描述 2、宽度由 174.4mm 改为 174.2mm 3、肩高由 204.0mm 改为 204.3mm 4、交流内阻 0.19±0.05mΩ改为 0.18±0.05mΩ 5、直流内阻 0.48±0.05mΩ改为 0.43±0.05mΩ	陈坤
2023.12.31	V1.2		1、电芯厚度中值由 71.6mm 改为 71.7mm； 2、尺寸公差由 0.5mm 改为 0.8mm； 3、补充预紧力说明；	陈坤
2024.06.20	V1.3		1、将电池安全测试参考方法及标准由 GB/T 36276-2018 升级为 GB/T 36276-2023；	陈坤

文 件 签 署 栏

Sign in this section

编制 Prepared by:	祁朋飞	2024年 6 月 12 日
审核 Checked by:	陈坤	2024 年 6 月 12日
会签 Countersigned by:	张存强 高磊 彭宏利	2024 年 6 月 12日
批准 Approved by:	郑洪龙	2024 年 6 月 12 日