

HENAN CHAOLI NEW ENERGY CO., LTD

河南超力新能源有限公司

SPECIFICATION FOR

Ni-Zn RECHARGEABLE BATTERY

镍锌电池规格书

Battery Model / 电池型号 CL-1.6V-AA1500mWh

Date / 日期 2022-02-18

These specifications apply to the CHAOLI sealed Ni-Zn Rechargeable Battery (CHAOLI) of the above-mentioned model.

本规格书适用于超力公司上述型号的可充镍锌电池

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Please sign and return one copy to us
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Client:

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Specification alteration history 规格变更记录

No. 序号	Date 日期	Edition 版次	Class* 类别	Main altered item 变更条款
1	2022-02-18	A/0	A	New revised/新版发行

*: Class A, D and R means added, deleted and revised respectively.

*: A, D 和 R 分别代表增加、删除和修订。

1.SCOPE / 适用范围

BATTERY MODEL / 电池型号: CL-1.6V-AA-1500mWh

2. NOMINAL SPECIFICATION 电池参数

2.1.Nominal voltage* 标称电压* 1.6V

2.2.Nominal capacity** 标称容量** 900 mAh

2.3.Charging*** 充电***

2.3.1 Standard Charge 标准充电 (25 °C ± 5 °C) :

0.2 C Charge:

0.2 C constant current charge to 1.92 V, then 1.92 V constant voltage charge until current less than 0.01 C, limit time 8 h, the total charging capacity shall not exceed 108% of the nominal capacity.

0.2C 恒流充电到 1.92 V, 然后 1.92 V 恒压充电到电流小于 0.01C 截止, 限制总充电时间 8 小时, 总充电量不超过 105%标称容量。

2.3.2 Quick Charge 快速充电 (25 °C ± 5 °C)

0.5 C Charge:

0.5 C constant current charge to 1.92 V, then 1.92 V constant voltage charge until current less than 0.01 C, limit time 6 h, the total charging capacity shall not exceed 105% of the nominal capacity.

0.5C 恒流充电到 1.92 V, 然后 1.92 V 恒压充电到电流小于 0.01C 截止, 限制总充电时间 6 小时, 总充电量不超过 105%标称容量。

2.3.3 Special charger charging****专用充电器充电**** (10°C~40°C)

Please use specified charger and charge batteries in recommended surroundings.

请使用专用充电器在推荐的环境条件下给电池充电。

2.4.Discharge 放电

Standard discharge 标准放电

0.2 C constant current charge to 1.3 V. 0.2C 恒流放电至 1.3V。

Quick discharge 快速放电

0.5 C constant current charge to 1.2 V. 0.5C 恒流放电至 1.2V。

2.5.Temperature (recommended) 温度条件

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Standard charge	标准充电	0 °C~40 °C
Quick charge	快速充电	10 °C~40 °C
Discharge	放电	-10 °C~50 °C
Storage	储存	-20 °C~30 °C

Note *:The nominal voltage is 1.65 V according to the standard SJ/T 11755-2020 <General specification for zinc-nickel batteries>, for simplicity of labeling, this specification uses 1.6 V as the nominal voltage.

***: Discharge capacity can be achieved by discharging to 1.3 V at 0.2 C after normal charge.

Five cycles are permitted for this test. The test can be terminated when any cycle meets the requirement.

****: Unless otherwise stated in the specification, the battery unit should be discharged to 1.3 V end voltage with 0.2 C before charging.

*****: The charging method of the charger is not used for battery performance testing.

注意 *: 依据行业标准 SJ/T 11755-2020 《锌镍蓄电池通用规范》标称电压为 1.65V, 为了标注简单, 本规格书使用 1.6V 为标称电压。

***: 电池经标准充电后, 以 0.2C 电流放电至终止电压 1.3V 所获得的容量。

该项试验允许进行 5 次循环, 任一次循环满足要求试验即可结束。

*****: 本规格书中除另有说明外, 充电前应将电池以 0.2C 电流放电至终止电压 1.3V。

*****: 充电器充电方法不用于电池性能检测。

3. APPEARANCE 外观

There shall be no broken, scratch, deformation, stain, electrolyte leakage and other undesirable phenomena.

电池无破裂、划痕、变形、污迹、电解液泄漏等不良现象。

4.ELECTRICAL CHARACTERISTICS 电性能

Testing conditions 测试条件

The battery shall be evaluated within 1 month from the arrival date.

以下测试需从电池到货日起, 一个月之内进行测试。

Unless otherwise stated in these specifications, the following test shall be carried out at 25 °C ± 5 °C, relative humidity of 65 % ± 20 %.

除非另有说明, 下述测试的环境温度为 25°C ± 5°C, 相对湿度为 65% ± 20%。

Test Items 测试项目	Test Conditions 测试条件	Requirements 要求	Remark 备注
Open-circuit Voltage (OCV) 开路电压	Voltage between the battery terminals shall be measured within 30 days after standard charge 标准充电 (0.2C 充电) 后 30 天内电池两引出端电压	≥1.65 V	
discharge (0.5 C) 放电 (0.5 C)	Discharge to 1.2 V at 0.5 C after standard charge and 10 min rest 标准充电, 搁置 10 分钟, 以 0.5 C 电流放电至 1.2V	≥850mAh	Up to 5 cycles are allowed 允许重复五次

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Test Items 测试项目	Test Conditions 测试条件	Requirements 要求	Remark 备注
0°C discharge (0.2 C) 0°C放电 (0.2 C)	After standard charging, it is stored at 0±1°C for 24 hours and discharged at 0.2C for 1.2V at 0±1°C 标准充电后, 0±1°C存放 24 小时, 在 0±1°C 0.2C 放电至 1.2V	≥595mAh	Up to 5 cycles are allowed 允许重复五次
45°C discharge (0.2 C) 45°C放电 (0.2 C)	After standard charging, it is stored at 45±1°C for 24 hours and discharged at 0.2C for 1.3V at 45±1°C 标准充电后, 45±1°C存放 24 小时, 在 45±1°C 0.2C 放电至 1.3V	≥720mAh	Up to 5 cycles are allowed 允许重复五次
Internal impedance (Ri) 内阻	Upon fully charge (1 KHz) 满电测试内阻	Max.45 mΩ	
Cycle life 1 循环寿命	See Remark 1 见备注 1	≥300 Cycles (60% initial capacity) ≥300 Cycles (60%初始容量)	
Charge retention 荷电保持	Discharged to 1.3 V at 0.2 C after standard charged and 28 days storage 标准充电后, 存放 28 天以 0.2C 电流放电至终止电压 1.3V	≥210 min	
Over-charge 过充	Discharged to 1.3 V at 0.2 C within 1 h after being charged at 0.1 C for 24 h, Limit charging voltage 1.9 V. 电池以 0.1C 电流充电 24 小时限制充电电压 1.9V 后 1 小时内, 以 0.2C 电流放电至终止电压 1.3V	≥290 min	
Continuous low-rate charging 涓流充电	After standard charged battery unit is charged at 0.03 C~0.05 C for 28 days (Trickle charge for 28 days after standard charge) 标准充电后持续涓流充电 28 天	No fire ,no explosion 不起火, 不爆炸	
Forced discharge 强制放电	The discharged cell is charged in reverse at 1 C for 90 min 单体电池 1C 反向充电 90 分钟	No fire ,no explosion 不起火, 不爆炸	

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Test Items 测试项目	Test Conditions 测试条件	Requirements 要求	Remark 备注
Vibration 振动测试	IEC 62133-1:2017 7.2.2 See Remark 2 见备注 2	No leakage, no fire ,no explosion 不漏液，不起火，不爆炸	

REMARK 备注:

1. Cycle life 循环寿命:

Cycle number (循环次数)	Charge 充电	Rest 搁置	Discharge 放电
1	—	5 min	0.5C to 1.2V 0.5C 放电至 1.2V
2 to 300	0.5 C constant current charge to 1.90 V, then 1.90 V constant voltage charge until current less than 0.01 C, limit time 7 h, the total charging capacity shall not exceed 105% of the nominal capacity. 0.5C 恒流充电到 1.90 V，然后 1.90 V 恒压充电到电流小于 0.01C 截止，限制总充电时间 7 小时，总充电量不超过 105%标称容量。	5 min	0.5C to 1.2V 0.5C 放电至 1.2V

2. Vibration 振动测试: IEC62133-1:2017 7.2.2

Frequency 频率	10~55 Hz
Amplitude 振幅	0.76 mm
Rate of frequency variety 频率变动速率	1 Hz/min
Duration 持续时间	90 min /axis (axis: X、Y、Z) 270 min in all 90 分钟/方向 X、Y、Z 轴 三个方向共 270 分钟
	Rest cell for 1h, and then make a visual inspection. 搁置 1h，然后进行目视检测。

5. ENVIRONMENTAL PROTECTION REQUIREMENT 环保要求

5.1 The requirement on Hazardous Substances in the materials must comply with CHAOLI'S criterion on HSF.

原材料中有害物质的要求满足我公司《有害物质管控标准》。

5.2 The requirement on Hazardous Substances in the Products must comply with 2013/56/EU and CHAOLI'S criterion on HSF.

产品中有害物质的要求满足欧盟 2013 / 56 / EU 指令及我公司《有害物质管控标准》。

5.3 CHAOLI corporation is not responsible for the collection and recycling of waste battery in directive 2013/56/EU

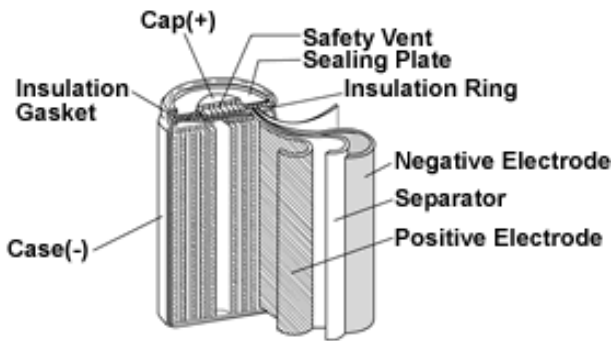
对于指令中的处理与回收条款不在本公司义务范围内

5.4 Battery interior constitution 电池内部构造图

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Do not disassemble the batteries, or may cause an internal or external short circuit, the exposed materials may react and lead to heat generation,

explosion, fire and splashing of alkaline electrolyte. Very dangerous!

禁止拆开超力电池。拆卸电池会引起短路，暴露的电池成分在空气中发生化学反应，会导致发热、爆炸、着火，还会造成电池碱液的飞溅，非常危险！

6.PRECAUTION 危险防范

Please keep in mind the following points when designing and manufacturing equipment. Please insert in your instruction manual. To prevent equipment malfunctions from affecting the batteries, be sure to use protection devices for electrical circuits and batteries.

在设计 and 生产设备的时候，请充分考虑下述事项，并将其加入到说明书中。为防止因电池影响造成设备故障，确保电路及电池配有防护装置。

※Warning 警告!

- Failure to carefully observe the following procedures and precautions can result in leakage of battery fluid (electrolyte), heat generation, explosion, fire and serious personal injury!

违反下述事项将会导致电池漏液、发热、爆炸、着火以及严重的人身伤害!

- Never dispose of CHAOLI batteries in a fire or heat them.

禁止将超力电池投入火中或加热。

- Do not connect the (+) positive and (-) negative terminals of CHAOLI batteries together with electrically conductive materials, such as wires. Do not transport or store CHAOLI batteries with their uncovered terminals or connected with a metal necklace or other electrically conductive material. When carrying or storing batteries, use a special case.

勿将超力电池正负极用导电物，如导线等直接连接。如正负极引出片未套绝缘套，请勿运输或储藏，运输及储藏电池注意勿让金属项链或其他导电物相接触，运输或储藏请用专用器具。

- Only charge CHAOLI batteries using those specific chargers that satisfy CHAOLI'S specifications. Only charge batteries under the conditions specified by CHAOLI.

须使用符合河南超力新能源有限公司要求的指定充电器对超力电池充电，并按河南超力新能源有限公司的指示对电池充电。

- Never solder lead wires directly on to CHAOLI batteries.

勿将导线直接焊接在超力电池上。

- The (+) positive and (-) negative terminals of CHAOLI batteries are predetermined. Do not force the terminals to connect to a charger or equipment. If the terminals cannot be easily connected to

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the charger or the equipment, check if the (+) and (-) terminals are incorrectly positioned.

电池正负极位置已预先设定，勿强迫将正负极端与充电器或用电设备连接，如果正负极端不能轻易接上充电器或设备，请检查正负极端位置是否正确。

- The gas release vent which release internal gas is located in the (-) Positive terminal of the CHAOLI battery. For this reason, never deform this section or cover or obstruct its gas release structure.

用于释放电池内气体的减压阀位于正极端，因此禁止将该减压装置弄变形或阻塞。

- Do not directly connect CHAOLI batteries to a direct power source or the cigarette lighter socket in a car.

禁止直接将超力电池直接与直流电源或与汽车电源直接相连接。

- CHAOLI batteries contain a strong colorless alkaline solution (electrolyte). The alkaline solution is extremely corrosive and will cause skin damage. If any fluid from a CHAOLI battery comes in contact with user's eyes, they should immediately flush their eyes and wash them thoroughly with clean water from the tap or another source and consult a doctor urgently. The strong alkaline solution can damage eyes and lead to permanent loss of eyesight.

超力电池内含有无色强碱溶液(电解液)，有强烈的腐蚀性，会引起皮肤灼伤。如果出现超力电池碱液接触使用者眼睛，应立即用清水冲洗，并请医生紧急处理，该强碱性电解液会损伤眼睛并导致永久失明。

- Do not treat CHAOLI batteries with water, seawater or other oxidizing reagents, as this can cause rust and heat generation. If a battery becomes rusted, the gas release vent may no longer operate, and can result in explosion.

勿将水、海水或其他的氧化试剂对电池进行处理，因这会引起电池生锈及发热。如果电池生锈，其减压阀将不能工作，因而会导致爆炸。

- Do not over-charge CHAOLI batteries by exceeding the predetermined charging period specified by the battery charger's instructions or indicator. If CHAOLI batteries are not fully charged after the battery charger's predetermined charging period has elapsed, stop the charging process. Prolonged charging may cause leakage of battery fluid, heat generation. Be sure to handle recharged batteries carefully as they may be not.

勿过充超力电池，即不要超过充电器说明或指示的预设充电时间继续充电。如果超力电池经过充电器预设充电时间充电后仍未充满，请停止充电，延长充电时间将会导致电池漏液、发热。

※CAUTION 注意!

- Do not strike or drop CHAOLI batteries.

勿碰撞或跌落超力电池。

- If CHAOLI batteries leak fluid, change color, change shape, or change in any other way, do not use them.

如超力电池漏液、变色、变形或有其他变化，请停止使用。

- Keep CHAOLI batteries and the equipment using them out of the reach of babies and small children, in order to avoid accidental swallowing of the batteries. In the event the batteries are swallowed, consult a doctor immediately.

将超力电池及用电池驱动之电子产品放置于婴儿、小孩难以触摸的地方，以免出现误吞食电池之意外。如果发生此意外，立即请医生处理。

- When the operating time of a CHAOLI battery becomes much shorter than its initial operating time even after recharged, it should be replaced to a new battery as its battery life has ended.

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当超力电池充满电后其使用时间远远少于其初始时的工作时间时，即该电池使用寿命已满，须换用新电池。

- Be sure to charge CHAOLI batteries within a temperature range of 0 to 40 deg C (degrees Celsius).
请在 0 ~ 40 摄氏度环境下充电。
- Be sure to use the recommended charging method for CHAOLI batteries read the battery charger's instruction manual carefully.
请遵照建议的充电时间充电并仔细阅读充电器说明书。
- Do not use or store battery at high temperature, such as in strong direct sunlight, in cars during hot weather, or directly in front of a heater. This may cause leakage of battery fluid. It could also impair performance and shorten operating life of CHAOLI batteries.
勿在高温下使用或储藏电池，例如在强烈阳光直射，天气炎热时在汽车内，及在发热器前直接使用。这会引起电池漏液，减弱电池性能，缩短电池寿命。
- Be sure to turn off the equipment after use of CHAOLI batteries, otherwise may result in leakage of battery fluid.
请确保设备在使用完毕后经关闭，否则会引起电池漏液。
- After removed from equipment, store CHAOLI batteries in a dry place and within the recommended storage temperature range. This will help preserve the batteries' performance and durability and minimize the possibility of leakage of battery fluid or corrosion. (CHAOLI recommends the storage temperature range from -20 to +30deg. for longer service life).
电池从设备上取下后应在干燥或建议之温度范围的地方放置，这有助于维持电池的性能，尽可能小地避免电池漏液或腐蚀(河南超力新能源有限公司建议在-20~30 摄氏度环境下储藏电池，以便延长电池的寿命)。
- Storage batteries should be charged one time every four months under the storage temperature of 30 °C and below, every three months under 40 °C and below, and every one month under 50 °C and below.
当电池分别储存在不高于 30℃，40℃，50℃下环境时，应分别每隔 4 个月，3 个月，1 个月对其充电 1 次。
- After long term storage, there is a possibility that the battery could not be fully charged. In order to fully charge it, please charge and discharge battery for a few times.
对于长期储存的电池，有可能该电池不能完全充满电，为了使这些电池可以充满电，请对其充放电几个循环。
- Do not use old and new batteries mixed together, or batteries at different charge levels. Do not use the CHAOLI battery mixed with a dry cell or other batteries of different capacity, type, or brand name. This may cause leakage of battery fluid and heat generation.
新旧电池及不同电量的电池不可混在一起使用，勿将超力电池与干电池或其他不同容量、不同种类、不同品牌的电池混在一起使用，这会导致电池漏液及发热。
- If the CHAOLI battery terminals become dirty, clean up them with a soft dry cloth prior to use. Dirt on the terminals can result in poor contact with the equipment, loss of power, or inability to charge.
如果电池引出端弄脏，请在使用前用干燥柔软的布擦拭，引出端的脏物会引起接触不良，掉电或无法充电。

8. WARRANTY 保证

One year limited warranty against battery self-defects.

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质保期一年(仅限于电池自身缺陷)。

Notice: To assure safety, please consult to the CHAOLI technical staff for your applications including electrical specifications, mechanical designs, protective devices and any special specification. CHAOLI reserve the right to alter or amend the design, model and specification without prior notice.

说明： 为确保安全，如有疑问请咨询河南超力新能源有限公司技术人员有关电量规格、机械设计、防护装置及其它特殊事项。河南超力新能源有限公司保留在没有预先通知的情况下改变和修正设计及规格说明书的权利。

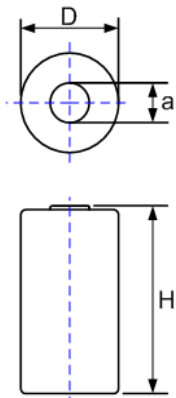
电话：0373-3091666；传真：0373-3091666

地址：河南省新乡市高新区德源路 93 号 ； 邮编：453000

网址：<https://superpnzn.1688.com> 或 www.zincl.com

Data Sheet

Model: CL-1.6V-AA-1500mWh

Nominal voltage (V) 标称电压		1.6
Capacity 容量 (mAh)	Nominal 标称	900
	Min 最小	850
Charging 充电	Standard 标准 ^[1]	0.2 C
	Quick 快速 ^[2]	0.5 C
Temperature recommended 建议温度 (°C)	Standard charge 标充	0~40
	Quick charge 快充	10~40
	Discharge 放电	-10~50
	Storage 存放	-20~30
Internal resistance 内阻		≤45 mΩ
Charge (capacity) retention 荷电保持 (25°C 28 days 0.2C discharge to 1.3V)		≥210 min
Weight 重量		Approx. 19.5 g
Dimensions With tube 带套管尺寸	D Diameter 直径	14.5 ⁺⁰ _{-0.7}
	H Height 高	50.5 ⁺⁰ _{-1.5}
	a Top diameter 帽径	5.0±0.3
Drawing 示图	Unit:mm	
		

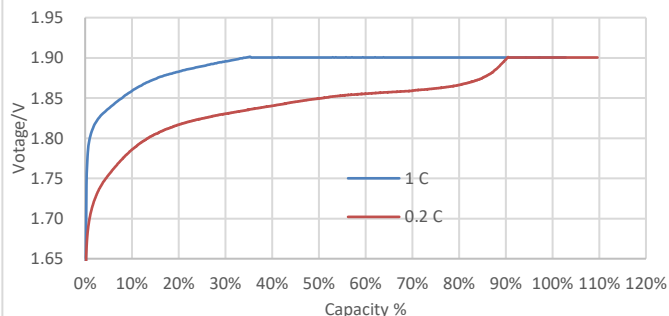
Note:

【1】0.2 C constant current charge to 1.92 V, then 1.92 V constant voltage charge until current less than 0.01 C, limit time 8 h, the total charging capacity shall not exceed 105% of the nominal capacity.
0.2C 恒流充电到 1.92 V, 然后 1.92 V 恒压充电到电流小于 0.01C 截止, 限制总充电时间 8 小时, 总充电量不超过 105%标称容量。

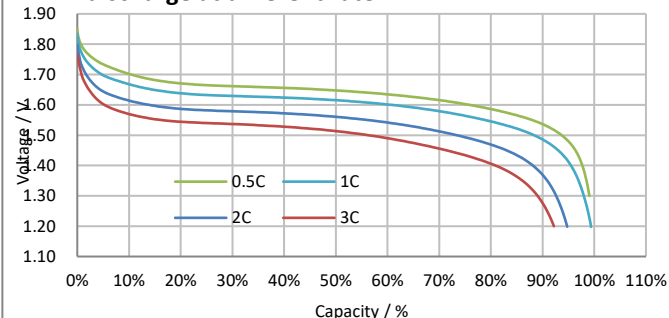
【2】0.5 C constant current charge to 1.92 V, then 1.92 V constant voltage charge until current less than 0.01 C, limit time 6 h, the total charging capacity shall not exceed 105% of the nominal capacity.
0.5C 恒流充电到 1.92 V, 然后 1.92 V 恒压充电到电流小于 0.01C 截止, 限制总充电时间 6 小时, 总充电量不超过 105%标称容量。

Typical Characteristics

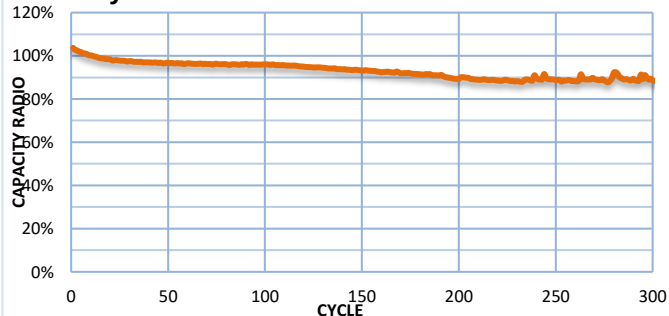
Ni-Zn charge at different rate



Ni-Zn discharge at different rate



Ni-Zn Cycle life



Note: The cycle life curve describes battery unit. Please discharge to the 1.3V end voltage with 0.2C before charging the battery unit.

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