



# Ni-MH BATTERY DELIVERY SPECIFICATIONS

## 镍氢电池规格书

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PRESENTED TO (呈送): \_\_\_\_\_

MODEL NO. (产品型号): Ni-MH L9V-220mAh

DATE (制作日期): 2023/04/03

Customer Part No. (规格书编号): GMCELL-GC-021

The version number (版本号): 01

|                                       |  |                |
|---------------------------------------|--|----------------|
| Specification<br>Approved<br>(规格书审批项) | Prepared By(编制)  |                |
|                                       | Checked By(审核)   |                |
| Customer<br>Approved<br>(客户审批项)       | Approved By(批准)  |                |
|                                       | Please sign and return one<br>copy to us.<br>请签名盖章确认后回传我司. | Seal the (盖章处) |



## 1. Scope (适用范围)

This specification governs the performance of the following Nickel-Metal Hydride cylindrical battery.

本规格书适用于本公司下述型号的可充性镍氢电池组。

## 2. Model (型号): Ni-MH L9V--220mAh

## 3. External Appearance (外观)

The cell / battery shall be free from cracks, scars, breakage, rust, discoloration, leakage and deformation. 电池/电池组外观无破裂、划痕、变形、生锈、污迹、电解液泄漏等不良现象。

## 4. Ratings (规定参数)

The data involving the nominal voltage and the approximate weight of the battery pack. 此资料包括电池的额定电压和大约重量。

| Description<br>种类   | Unit<br>单位 | Specification<br>规格                            | Conditions<br>条件   |
|---|------------|--|--|
| Nominal Voltage<br>标称电压   | V          | 8.4V   |  |
| Rated Capacity<br>额定容量  | mAh        | 220  | Standard charging / discharging<br>标准充电/放电   |
| Minimum Capacity<br>最小容量  | mAh        | 220  | Standard charging / discharging<br>标准充电/放电   |
| Standard Charge<br>标准充电   | mA         | 22(0.1C)                                       | Ta 环境温度=0~45°C (see note)  |
|   | hour       | 16   |  |
| Fast Charge<br>快速充电   | mA         | 110With charge termination control<br>用充电控制或保护 | - $\Delta V=50\text{mv}/\text{PCS}$<br>Timer cutoff=110% input capacity<br>Temp. cutoff= 40~50°C,<br>Ta= 0~40°C<br>dT / dt=0.6°C / min |
|   | hour       | 2.4  |  |
| Trickle Charge<br>涓流充电  | mA         | 6.6(0.03C)                                     | Ta 环境温度=0~45°C (see note)  |
| Discharge Cut-Off Voltage<br>闭路电压   | V          | 7.0  | Less than 1.0C discharge<br>小于 1C 放电   |
| Maximum Continuous Discharge Current<br>最大连续放电电流                            | mA         | 440(2C)  | Ta= -10~50°C<br>环境温度   |
| Storage Temperature<br>(Percent 40-60 charged state)<br>储存温度<br>(充电 40-60%) | °C         | -20-50   | Less than 30 days<br>储存时间少于 30 天   |
|   |            | -20-40   | Less than 90 days<br>储存时间少于 90 天   |
|   |            | -20-30   | Less than 360 days<br>储存时间少于 1 年   |
|   | %          | 65±20  | Relative humidity<br>相对湿度  |
| Typical Weight<br>重量  | g          | 36.5   | Approx. 大约   |



## 5. Performance (电池性能)

Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

除非其它规定，测试应在到货之日起 1 个月内进行，并且符合以下测试条件：

Relative humidity (相对湿度) : 65±20% RH.

Ambient Temperature (环境温度) (Ta) : 25 ± 5°C。

\*\*\*Notes: Standard charge / discharge condition (注意: 标准充电/放电条件)

Charge (充电) : 22mA (0.1C) x 16 hrs, 30min (搁置) rest

Discharge (放电) : 44 mA (0.2C) to 7.0V

\*\*\*The batteries must be standard discharged before charging (电池充电前必须先放电)。

\*\*\*Battery test vide infra (电池测试参见下文) :

| Test<br>测试项目                           | Unit<br>单位         | Specification<br>规格   | Conditions<br>条件  | Remarks<br>备注                         |
|--|--------------------|---|---|---------------------------------------|
| Capacity<br>容量                         | <b>mAh</b>         | ≥220  | standard Charge / Discharge<br>标准充电/0.2C 放电   | Up to 3 cycles<br>Allowed<br>允许循环 3 次 |
| Open Circuit<br>Voltage (OCV) 开路<br>电压 | <b>V</b>           | ≥9.0  | Within 7 days after standard charge<br>电池标准充电后 7 天内   | Unit: pcs<br>单位: PCS                  |
| Internal<br>Impedance 交流内阻             | <b>mΩ</b>          | ≤800  | Upon fully charge (1Khz)<br>电池充满电后 (1Khz的交流频率)  | Unit: pcs<br>单位: PCS                  |
| Discharge<br>放电<br>(0.2C)              | <b>min</b>         | ≥300  | standard charge, 30min rest before<br>discharge at 0.2C to 7.0V<br>标准充电, 搁置 30 分钟后以 0.2C<br>放电至 7.0V  | Up to 3 cycles<br>Allowed<br>允许循环 3 次 |
| Over charge<br>过充电                     | <b>N/A</b>         | No leakage<br>nor explosion<br>不漏液<br>不爆炸                                       | 0.1C charge for 48 H<br>用最大不超过 22mA (0.1C)电流充电 48 小时  |                                       |
| Charged retention<br>荷电保持率             | <b>mAh</b>         | ≥165(75%)   | Standard charge, storage for 1 year standard discharge at<br>20°C ± 2°C<br>在 20 ± 2°C 环境温度下标准充满电后存放 1 年, 以标<br>准 0.2C 放电至 7.0V  |                                       |
|  | <b>mAh</b>         | ≥143 (65%)  | Standard charge, storage for 28 days, standard discharge<br>at 60°C ± 2°C<br>标准充满电后, 在 60 ± 2°C 环境温度下存 28 天, 以标<br>准 0.2C 放电至 7.0V  |                                       |
| IEC Cycles Test<br>循环寿命测试              | <b>cycle<br/>次</b> | ≥500  | IEC 61951-2(2003) 7.4.1.1   |                                       |
| Short Circuit<br>短路测试                  | <b>N/A</b>         | Deformatio &<br>leakage may<br>occur but no<br>explosion<br>允许变形或漏液,<br>但不允许爆炸。 | After standard charge, short circuit for 1 hr<br>引线(lead wire = 1.5mm <sup>2</sup> x 20mm)<br>标准充电方式充电后短路 1 个小时   |                                       |
| Vibration<br>Test<br>振动测试              | <b>N/A</b>         | △ V < 0.70V   | Charge at 0.1C for 16 hrs, then leave for 24 hrs.<br>Check battery before/after vibration.<br>0.1C 充电 16 小时后放置 24 小时, 检查电池振动前后的<br>电压。<br>Amplitude 振幅: 1.5mm,<br>Vibration 振动: 3000CPM<br>any direction for 60 mins 任意方向 60 分钟 |                                       |

|                   |     |                    |  |
|-------------------|-----|--------------------|--|
| Drop Test<br>跌落测试 | N/A | $\Delta V < 0.70V$ | Charge at 0.1C for 16 hrs, then leave for 24 hrs. Check battery before / after drop on the wooden board of thickness: 30 mm<br>Height: 50 cm<br>Direction is not specified test for 3 times.<br>充电 16 小时后放置 24 小时后, 电池从 50cm 高度任意方向自由坠落到厚 30mm 的木板上 3 次。 |
|-------------------|-----|--------------------|--|

## 6. Warranty (保证)

One year limited warranty against workmanship and material defect.

我们对工艺和材料的保证期限为 1 年。

## 7. Cautions (使用注意事项)

- Reverse charging is not acceptable.  
应将电池极性正确连接, 不可反接。
- Charge before use, use the correct charger for Ni-MH batteries.  
使用之前请充电, 请使用 Ni-MH 专用充电器。
- Do not charge / discharge with more than the specified current.  
请不要超过规格要求电流对电池/电池组进行充放电。
- Do not short circuit the cell / battery.  
请不要将电池/电池组短路。
- Do not incinerate or mutilate the cell/battery.  
请不要将电池/电池组投入火中或试图拆开。
- Do not solder directly to the cell / battery.  
请不要在电池/电池组上直接焊锡。
- The life expectancy may be reduced if the cell / battery is subjected to adverse conditions, like extreme temperature, deep cycling, excessive overcharge /over-discharge.  
如果电池/电池组在极限条件下使用, 可能减少寿命:  
如: 极限温度, 深度循环, 过充电或过放电。
- Store the cell / battery in a cool dry place.  
电池/电池组应储存在阴凉干燥处。
- For charging methods please reference to our technical handbook.  
充电方法请参考我们的技术手册。
- When find battery power down during use, please switch off the device to avoid overdischarge.  
电池使用时发现功率下降, 请关闭用电器开关以防止电池过放。
- When not using a battery, disconnect it from the device.  
当电池不使用时, 请把它从装置上取下。
- well-ventilated place out of direct sunlight.  
电池使用后, 如果电池发热, 再次充电前, 请在通风环境中冷却。
- During long term storage, battery should be charged and discharged once every half a year.  
经过长时间存放, 电池应每三个月进行一次充放电。
- When the battery is hot, please do not touch it and handle it, until it has cooled down.  
如果电池发烫, 请勿触摸, 直至冷却。
- Do not mix batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon batteries.  
请不要将电池与其他品牌的电池或者不同种类的电池, 比如碱性锌电池混用。
- Do not mix new batteries in use with semi-used batteries, battery may be over-discharged.

请不要将新旧电池混用,可能会导致过放电。

17. Do not mix new batteries in use with semi-used batteries, battery may be over-discharged.

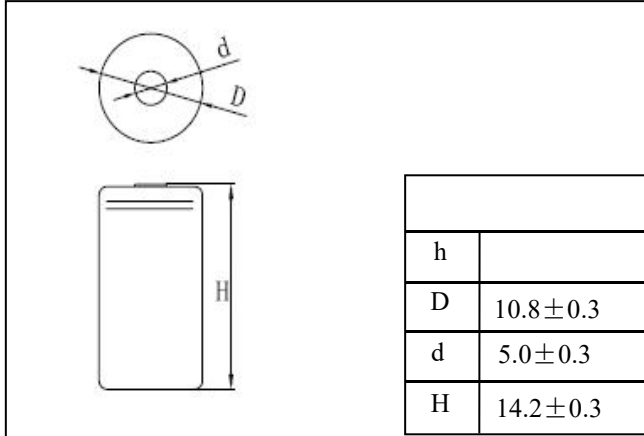
请不要尝试分离、挤压、撞击电池,电池会发热或起火。电池中的碱液对皮肤、衣服和眼睛有害,而且会损伤衣服。

18. Keep away from children. If swallowed, contact a physician at once.

放在儿童拿不到的地方,如果发现吞食,请立即联系医生。

### 8.Specifications of single cell (单粒电池规格)

Dimensions 外形尺寸(mm)



Nominal Voltage 标称电压: 1.2V

Rated Capacity 额定容量: 220 mAh

Minimal Capacity 最小容量: 220mAh

Standard Charge 标准充电: 22mA, 16hrs

Rapid Charge 快速充电: 110 mA, 2.4 hrs (control required)

Continuous Discharge 连续放电: less than 440mA

Final Discharge Voltage 放电终止压: 1.0V

Weight 重量: 4.8g (Approx)

Service Life 循环寿命: (>500cycles)

(according to IEC discharge characteristics standard)

根据 IEC 标准测试

Internal Resistance 内阻: ≤100mΩ

Ambient Temperature 周边温度:

Standard charge 标准充电: 0~45℃

Rapid charge 快速充电: 0~40℃

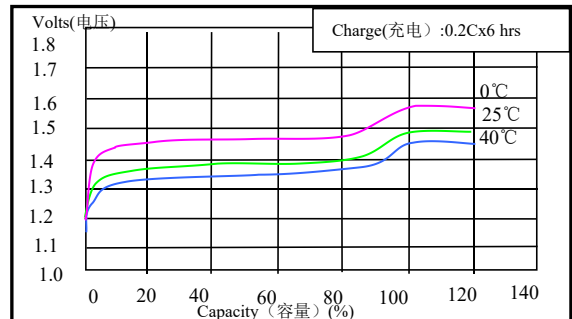
Discharge 放电: -20~50℃

Store(贮存): (65±20% RH)

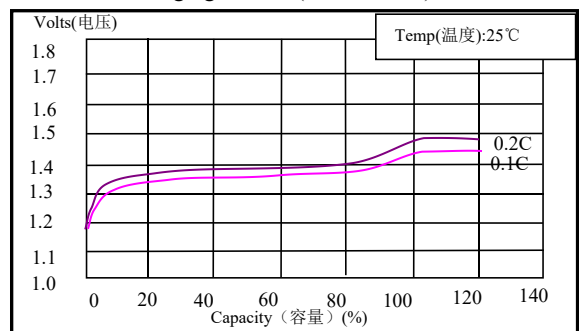
Less than 30 days(少于 30 天): -20~50℃

Less than 90 days(少于 90 天): -20~40℃

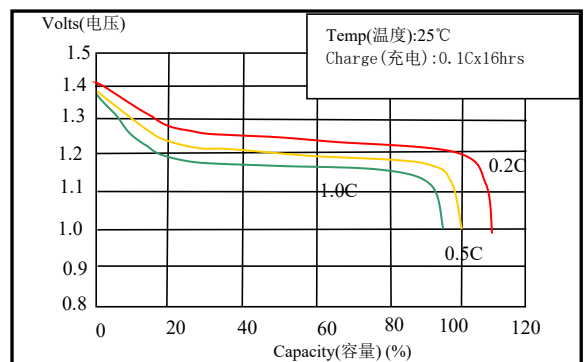
Less than 360 days(少于 1 年): -20~30℃



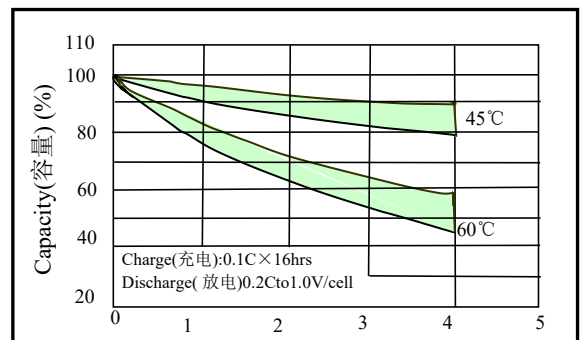
0.2C Rate Charging Curves (充电曲线图)



0.1C/0.2C Rate Charging Curves(充电曲线图)



0.1C/0.5C/1.0C Rate Discharging Curves(放电曲线图)



Storage & self discharge Curves

不同温度荷电保持曲线图

Weeks(周)

**Note(注意):**

1. After charge at 0.1C for 16hrs and discharge at 0.2C to 1.0V at 25°C)。

0.1C 充电 16 小时后在 25°C 温度下 0.2C 放电到 1.0V。

2. Control required: 充电控制条件

1) - ΔV: 0~5mV    2) dT/ dt: 0.6°C/ min    3) Tco: 45~ 50°C

9. Notes (备注): 1. Ta: Ambient Temperature 环境温度

2. Approximate charge times from discharged state, for reference only. 充放电时间仅供参考

3. IEC 61951-2 (2003) Cycle Life Test 循环寿命测试

| Cycle No.<br>循环工步号   | Charge<br>充电                           | Rest<br>搁置         | Discharge<br>放电                          |
|--|--|--------------------|--|
| 1  | 0.1C×16hrs<br>0.1C 充电 16 小时            | None<br>无          | 0.25C×2hs20mins<br>0.25C 放电 2 小时 20 分    |
| 2-48   | 0.25C×3hrs10mins<br>0.25C 充电 3 小时 10 分 | None<br>无          | 0.25C×2hs20mins<br>0.25C 放电 2 小时 20 分    |
| 49   | 0.25C×3hrs10mins<br>0.25C 充电 3 小时 10 分 | None<br>无          | 0.25C to 1.0V/cell<br>0.25C 放电 2 小时 20 分 |
| 50   | 0.1C×16hrs<br>0.1C 充电 16 小时            | 1-4hr(s)<br>1~4 小时 | 0.2C to 1.0V/cell<br>0.25C 放电 2 小时 20 分  |
| Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3hrs<br>循环从工步 1 到工步 50 必须重复进行, 直到工步 50 的放电容量低于 3 小时。 |  |                    |  |

Configurations, Dimensions And Markings (光身外形最大尺寸): W26.5mm\*H48.5mm\*L17.5mm

R3- The Black shell (R3-黑壳)

