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1. 修订履历  
Modified List

产品变更履历表  
Product Modified Record List

版本 Revision	日期 Date	标记 Mark	变更内容 Modified Content	批准 Approved
V1.0	2014-9-2			

## 2. 适用范围(Scope):

本说明书用于本书中涉及的深圳市高巨能科技有限公司的镍氢电池产品。

This specification is applied to the reference battery in this Specification and manufactured by Shenzhen GMCELL Technology Co., Ltd.

## 3、型号(MODEL): GMCELL-AA1200mAh 4.8V

## 4、外观(APPEARANCE):

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。

The cell / battery shall be free from cracks, scars, breakage, rust, discoloration, leakage and deformation.

## 5、规格、性能检测(RATINGS):

以下项目作为评估电池的基本指标，可根据需要对电池进行测试。

Table below can be taken as the basic guideline of evaluation the battery quality.

5.1 环境温度(ambient temperature)20±5℃，相对湿度(Relative Humidity): 65±20%

5.2 测试工具要求满足(Testing facility must conform to the condition):

电流表:IEC 51/IEC 485 所规定的 0.5 级或以上。包括引线总电阻小于 0.01Ω

Ampere meter: IEC 51/IEC 485 stipulated grade 0.5 or above, including the down-lead resistance totally less than 0.01Ω

内阻仪:交流 1KHz 正弦波 4 端子测量设备

Resistance tester: AC 1 KHz sine wave 4 terminals testing equipment

## 6、常规性能 (General Performance) :

项目 Item	规格 Specification	条件 Conditions
标准充电 Standard charge	120 mA (0.1C)	环境温度 20±5℃，相对湿度: 65±20% ambient temperature of 20±5℃, Relative Humidity: 65±20%
	16 hrs	
标准放电 Standard discharge	240 mA (0.2C)	标准充电后，放电截止电压 4.0V standard charge, the final voltage is 4.0V
快速充电 Rapid Charge	600mA (0.5C)	-ΔV=15~30mV 环境温度 20±5℃，相对湿度: 65±20% ambient temperature of 20±5℃, Relative Humidity: 65±20%
快速放电 Rapid discharge	600mA (0.5C)	标准充电后，放电截止电压 4.0V standard charge, the final voltage is 4.0V
涓流充电 Trickle Charge	24~60 mA (0.02C~0.05C)	Ta=-10~45℃
标称电压 Nominal Voltage	3.6 V	
开路电压 Open circuit voltage	≥5.0V	标准充电后，1hrs 内测量 Within 1 hr after standard charge
标称容量 Nominal Capacity	1200 mAh	
最低容量 Minimum Capacity	≥1200 mAh(0.2C)	标准充放电. Standard charge and Standard discharge
	≥1080 mAh(0.5C)	标准充电快速放电. Standard charge and Rapid discharge
内阻 Internal Impedance	≤220mΩ	标准充电后，一小时内测量 Within 1 hr after standard charge
重量 Weight	约 80 g	Approx:80g

荷电保持率 Charge-retention Rate	荷电保持率≥标称容量 60%(720mAh) Charge retention rate ≥Nominal capacity 60%(720mAh)	标准充满电后贮藏 28 天, 标准 0.2C 放电至 4.0V Storage a period of 28 days after standard charge, then Standard discharge (0.2C) to 4.0V
循环寿命 Cycles Test	≥ <u>500</u> Cycles	IEC61951-2:2003 (see note 2)

### 7、环境性能 (Environment Performance) :

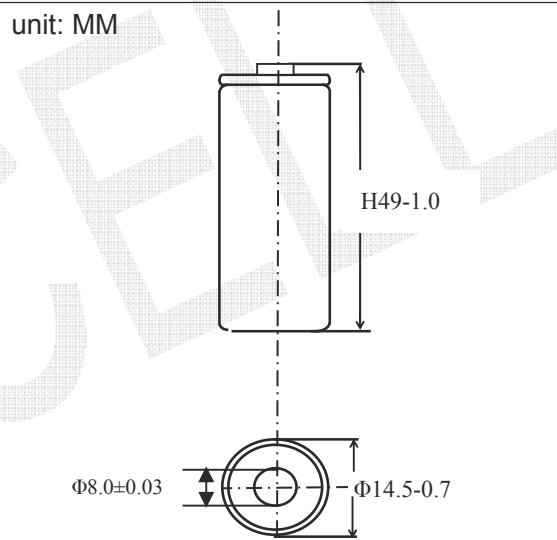
储存温度 Storage Temperature	Within 1 year	-20~25℃
	Within 6 months	-20~35℃
	Within 1 months	-20~45℃
	Within 1 week	-20~55℃
使用环境温度 Operation Temperature	Standard charge	15~25℃
	Fast Charge	0~45℃
	Discharge	0~45℃
恒定湿热性能 Constant humidity and hot performance	不坏损 No damage	标准充电后, 在温度 33±3℃, 湿度 80±5%的环境中放置 14 天。Full charge the battery at current 0.1C, 33±3℃, 80±5%R.H., storage 14 days.

### 8、安全性能 (Safe Characteristic) :

过充电特性 Over-charge	无变形无漏液;容量大于等于额定容量。 No leakage nor explosion apacity≥100%	将电池以 0.2CmA 放电至 4.0V, 先标准充电, 再以 0.1CmA 充电 48 小时后, 以 0.2CmA 放电, 测定电池容量。 0.2C discharge to 4.0V, 0.1C charge for 48 hrs, then test the Capacity with Standard discharge Conditions
过放电特性 Over-discharge	无变形无漏液;容量大于等于额定容量 80%。 No leakage nor explosion Capacity≥960mAh	将电池以 0.2CmA 放电至 4.0V, 然后将电池串联负载 12.9Ω, 经 24 小时后, 再将电池按标准充电标准放电后测定电池的容量。 0.2C discharge to 4.0V, Combine the battery with a 12.9Ω electric resistance, after stored for a period of 24 hrs, then test the Capacity with Standard discharge Conditions
振动测试 Vibration Test	电压变化:≤0.09V/只 内阻变化:≤15 mΩ/只 Voltage variety: ≤0.09V/cell Internal impedance: ≤15 mΩ/cell	0.1C 充电 16 小时, 搁置 24 小时, 振动前后检测电池。 振动条件: 振幅 1.5mm, 频率 3000CPM, 任意方向振动 60 分钟 Charge at current 0.1C for 15hrs; place for 24 hrs, check the battery before and after vibration. Vibration condition: Swing: 1.5mm, Frequency: 3000CPM, Vibrate for 1hr to any direction.
自由跌落 Drop Test	电压变化:≤0.09V/只 内阻变化:≤15 mΩ/只 Voltage variety: ≤0.09V/cell Internal impedance: ≤15 mΩ/cell	0.1C 充电 16 小时, 搁置 24 小时, 落下前后检测电池; 冲击条件:从 1.5m 高处任意方向自由落下三次, 落至木板表面 (厚度 10mm)。 Charge at current 0.1C for 15hrs, place for 24 hrs, check the battery before and after fall down test; Impact condition: Fall down from height 1.5m to any direction on the hard-wood board( Thickness:10mm), test for 3 times

安全性 Safety	无破裂或爆炸,但允许漏液和变形. No disrupt or burst, explosion, but leakage of electrolyte and deformation are acceptable	电池在环境温度 $20\pm 5^{\circ}\text{C}$ 下以恒流 $0.2\text{I}_A$ 强制放电至 $0.0\text{V}$ ,然后将电流提高到 $1.0\text{I}_A$ ,并在相同环境温度下继续强制放电 60 分钟. The battery shall undergo a forced discharge in an ambient temperature of $20\pm 5^{\circ}\text{C}$ , at a constant current of $0.2\text{I}_A$ , to a final voltage of $0\text{V}$ . the current shall then be increased to $1.0\text{I}_A$ and the forced discharge continued in the same ambient temperature of $20\pm 5^{\circ}\text{C}$ , for 60 min.
短路测试 External Short Circuit	不着火不爆炸 No fire and no explosion	标准充电后,在 $20^{\circ}\text{C}\pm 5$ 环境中用超过 $0.75\text{mm}^2$ 金属丝将单颗电池短路至电池恢复到常温。 After standard charge, short-circuit the cell at $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ until the cell temperature returns to ambient temperature. (cross section of the wire or connector should be more than $0.75\text{mm}^2$ )

**9、单体电池尺寸(Specifications of single cell):**

TYPE	Nickel-Metal Hydride cylindrical single cell		unit: MM 
MODEL	GMCELL- AA1200mAh 1.2V		
Dimensions	diameter	14.5-0.7mm	
	Height	49-1.0mm	

**10、充放电特性(characteristic of charge/discharge):**

Note 1: 标准充放电. Standard charge and Standard discharge

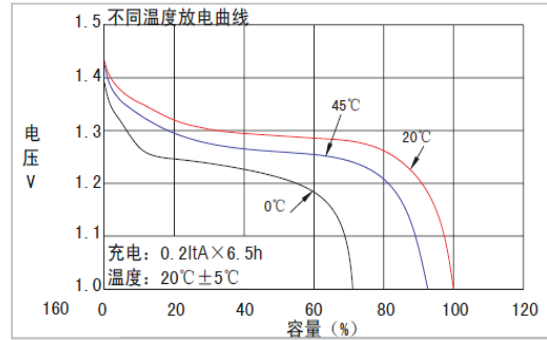
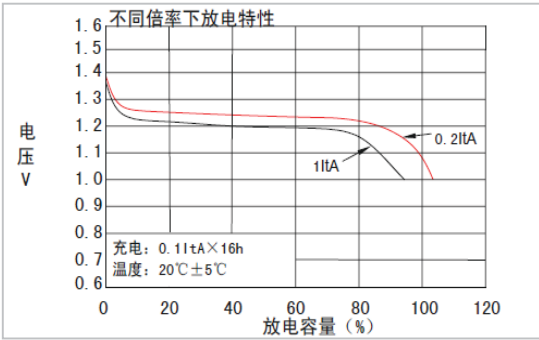
Note 2: (1). Ambient temperature:  $20\pm 5^{\circ}\text{C}$ , Relative Humidity:  $65\pm 20\%$

(2). IEC 标准循环寿命测试方法 (Life test method of IEC61951-2:2003) :

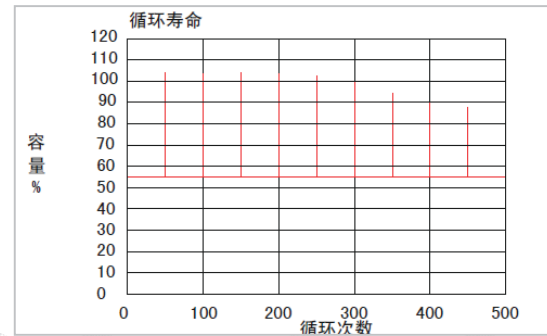
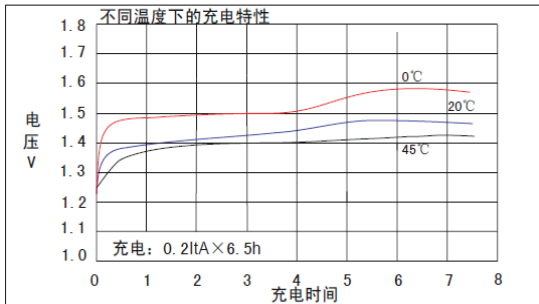
Cycle Number	Charge	Stand in charged condition	Discharge
1	$0.1\text{C}\times 16\text{hrs}$	None	$0.25\text{C}\times 2\text{hrs } 20\text{min}$
2~48	$0.25\text{C}\times 3\text{hrs } 10\text{min}$	None	$0.25\text{C}\times 2\text{hrs } 20\text{min}$
49	$0.25\text{C}\times 3\text{hrs } 10\text{min}$	None	$0.25\text{C}$ to $4.0\text{V}/\text{cell}$
50	$0.1\text{C}\times 16\text{hrs}$	1~4hrs	$0.20\text{C}$ to $4.0\text{V}/\text{cell}$

重复 1 至 50 次循环,直至某一第 50 次循环的放电时间少于 3 小时

Cycles 1 to 50 shall be repeated until the discharge duration on any 50<sup>th</sup> cycle become less than 3h. At this stage, a repeat capacity measurement as specified for 50 shall be carried out



特征曲线



### 11、保证期(Quality guarantee period):

电池保质: 12个月.

建议: 本公司产品在出厂时根据运输距离和包装条件已充20-80%的电量, 贵公司在检测容量时, 先用0.2C放电至4.0V/只; 再标准电流充放, 进行容量检测、补充电。如果库存时间有3个月或以上的, 先用0.2C放电至4.0V/只, 然后用0.1C充电16hrs, 搁置20min, 以0.2C放电至4.0V/只, 经活化后; 再标准电流充放, 进行容量检测。首次使用时建议采用标准充电法充电, 以免对电池造成伤害。

Guarantee time for one year due to the processing and raw material defectiveness.

Suggestion: The products before delivery would be charged 20-80% capacity according to the transportation distance and packing condition. While checking the capacity, please discharge the battery at 0.2C to 4.0V/cell; then charge and discharge the battery at by standard current. If the storage time over 3 months or above, please discharge the battery at the current 0.2C to 4.0V/cell, then charge the battery at 0.1C for 15 hours, after that place for 20mins, discharge the battery at 0.2C to 4.0V/cell. After this activation, check the capacity by the standard current charge and discharge the battery. The first time use suggested to take standard charge method to charge the battery to prevent from damage to battery.

### 12、注意事项(Cautions):

#### ⚠ 注意 (Note):

- ◆ 电池在使用前必须充电.

Batteries should be charged prior to use.

- ◆ 在使用新电池前, 或者长期存放后第一次使用电池, 在使用前请将电池充满电.

When using a new battery for the first time or after long term storage, please fully charge the battery before use.

- ◆ 充电方法请参考我们的规格书.

For charging methods please reference to our specifications.

- ◆ 使用 Ni-Cd 或 Ni-MH 专用充电器.

Use the correct charger for Ni-Cd or Ni-MH batteries.

- ◆ 将电池贮存在阴凉干燥处.

Store batteries in a cool dry place.

- ◆ 当把电池放入充电器中时, 注意保证极性正确.

When connecting a battery pack to a charger, ensure correct polarity.

- ◆ 当电池不使用时, 请把它从装置上取下.

When not using a battery, disconnect it from the device.

- ◆ 经过长时间存放, 电池应每三个月进行一次充放电.

During long term storage, battery should be charged and discharged once every 3 months.



### 警告 (Warning):

- ◆ 不要对电池进行反充电.

Do not reverse charge batteries.

- ◆ 不要将电池短路,那可能永久的损坏电池。

Do not short circuit batteries, permanent damage to batteries may result.

- ◆ 不要让电池处于不利环境中, 比如极端的温度, 深度循环, 或者经常过充/过放电

Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive Overcharge / over discharge.

- ◆ 不要将 GMCELL 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 GMCELL batteries with other battery brands or batteries of a different chemistry such as Alkaline and zinc carbon

- ◆ 不要将新旧电池混用, 可能会导致过放电.

Do not mix new batteries in use with semi-used batteries, over discharge may occur

- ◆ 如果出现噪音, 温度异常, 或者漏液, 请停止使用.

If find any noise, excessive temperature or leakage from a battery, please stop its use.

- ◆ 如果电池发烫, 请勿触摸, 直至冷却.

When the battery is hot, please do not touch it and handle it, until it has cooled down.

- ◆ 不要把电池 (电池组) 的外套去除.

Do not remove the outer sleeve from a battery pack nor cut into its housing.

- ◆ 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 find battery power down during use, please switch off the device to avoid over discharge

 **危险 (Danger):**

- ◆ 不要燃烧或毁坏电池, 可能导致有毒气体释放或爆炸.  
Do not incinerate or mutilate batteries, may burst or release toxic material.
- ◆ 禁止将电池在密闭环境中使用. 需要保持通风; 否则电池可能产生氢气, 导致爆炸.  
Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
- ◆ 取下电池组时, 用手抓住插头而不是拉线.  
Unplug a battery by holding the connector itself and not by pulling at its cord
- ◆ 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.  
After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
- ◆ 不要将电池放入水中或海水中.  
Never put a battery into water or seawater.
- ◆ 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和眼睛有害, 而且会损伤衣服.  
Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
- ◆ 要使电池远离儿童. 如发现吞食, 立即联系医生.  
Keep away from children. If swallowed, contact a physician at once

### 13、电池组合结构图(PACK-UP DIAGRAM):

文件编号: LTT-RTD-D1850

**技术要求:**

- 1、单个电池贴白色面垫, 收缩 PVC; 电池排列整齐,用 502 胶固定;
- 2、电池头(底)部焊接连接片要牢固, 无歪斜, 无虚焊、无炸火、无漏焊, 要求正、负极点四个焊点, 点焊时注意每半个小时检一次有无虚焊;
- 3、焊线光滑无毛刺, 热收缩外套 PVC 后不能有明显突出.
- 4、组合喷码: GMCELL Ni-MH AA1200mAh 4.8V

NO	名称	规格	数量	单位	备注
13	PE 袋	700*900mm	1	个	套箱内
12	单体面垫	13.4*8.0*0.25mm	480	片	白色 PET 圆孔
11	外箱	310*240*170mm	1	个	12 盒/箱 K=K
9	小白盒	145*75*70mm	12	个	10 组/盒 W9A
8	电池	49AAP1100	480	只	按 2 分钟一档组合
7	醋酸胶布	55*12mm	120	片	贴在电池组头部
6	连垫	AA 四连垫	120	片	青稞纸(贴在电池组底部)
5	反向插头	5264-2P UL1007 22#	120	套	红线 160mm 直角 3 号焊 黑线 200mm 直角 4 号焊
4	组合 PVC	65#*64*0.12mm	180	g	051#果绿
3	单体 PVC	23#*53*0.12mm	154	g	051#果绿
2	引出片	4*7*0.1mm	240	片	430 材质
1	连接片	4*18*0.1mm	360	片	镀镍

型号	49AAP1100	深圳市高巨能科技有限公司		工艺图纸	
电池类型	NI-MH				
标准电压	4.8V	图纸编号: 1803038	客户代号: BON-061	版本 A0	页码
编制:	审核:	业务确认:	批准:		1/1