

# 江苏海四达镍氢电池产品规格书

## HIGHSTAR NIMH BATTERIES PRODUCT SPECIFICATIONS

MODEL NO.: Ni-MH SC2200mAh High Temperature 1.2V

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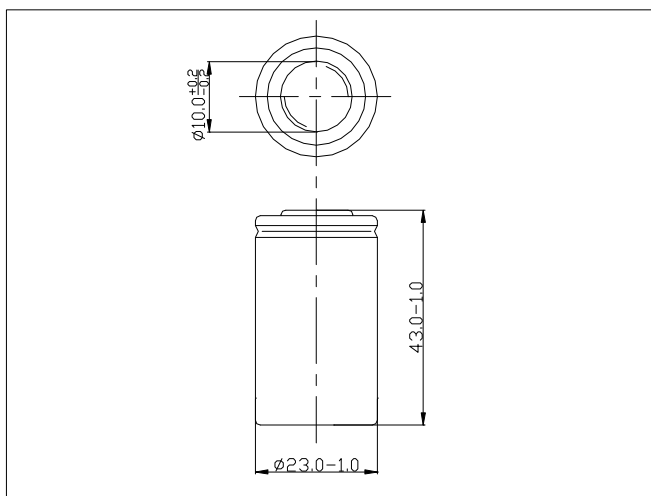


型号(Type) : QNYSC2200mAh High Temperature

单颗电池规格 Specifications of single cell

标称电压 Nominal voltage		1.2V	
容量 Capacity		0.2C 放电 Discharge	1.0C 放电 Discharge
	最小 Minimum	300min	50min
	典型 Typical	310min	58min
尺寸 Dimensions	直径 Diameter	mm	
		23.0 <sup>-1.0</sup>	
	高 Height	43.0 <sup>-1.0</sup>	
大约重量 Weight(Approximately)		克 gram	
		51.0	
充电 Charge	标准 Standard	220mA(0.1C)×15hrs	
	涓流 Trickle	110mA(0.05C)×24hrs	
环境温度 Ambient temperature	充电 Charge	标准 standard	0°C to 50°C
		涓流 Trickle	0°C to 70°C
	放电 Discharge	-20°C to 70°C	
	贮藏 Storage	-20°C to 40°C	

单颗电池尺寸包括 PVC (Dimensions with PVC of single cell)



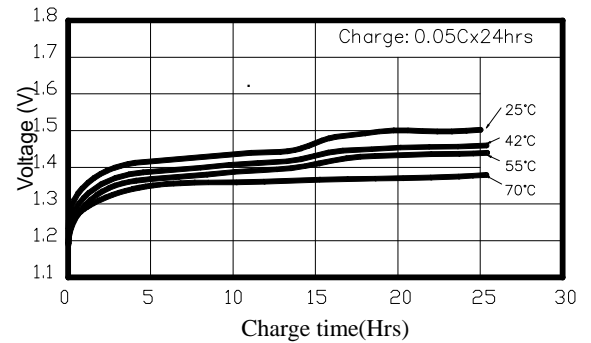
备注 Note:

1. 标称容量是指 20°C 时 0.2C 放电容量  
Nominal capacity, rated at 0.2C 20°C.
2. 重量作为参考  
Weight are for reference.
3. 寿命测试依照 IEC 标准  
Standard according as IEC of test cycle life.

典型特征 Discharge characteristics

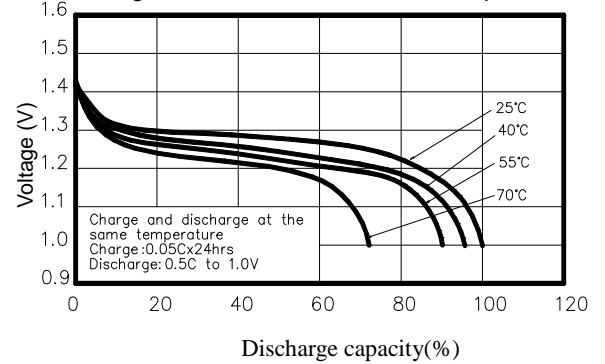
不同温度下充电特性

Charge characteristics at different temperature



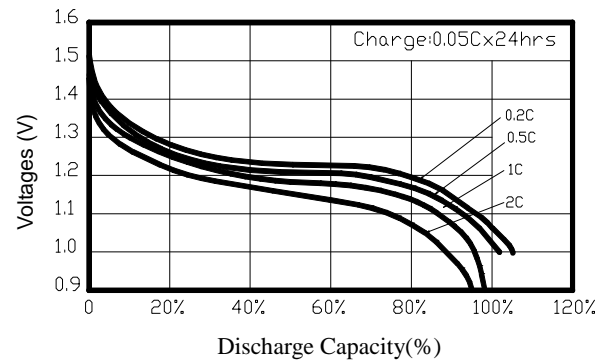
不同温度下放电特性

Discharge characteristics at different temperature



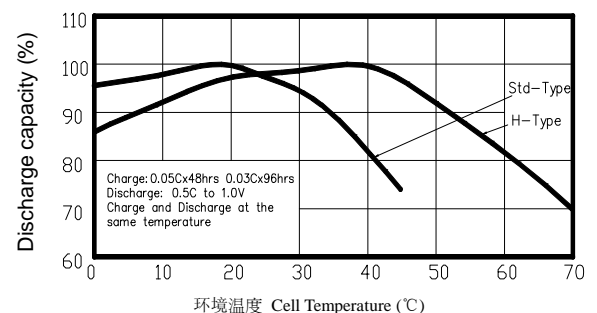
25°C 下不同倍率放电特性 Discharge characteristics

at different rate at temperature of 25°C



高温镍氢电池在不同温度下放电容量特性 (与标准型镍氢电池比较)

Discharge capacity characteristics of high temperature Ni-MH at different temperature (compared with standard Ni-MH battery)



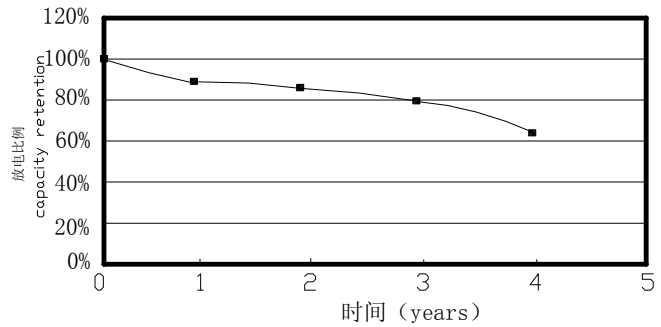
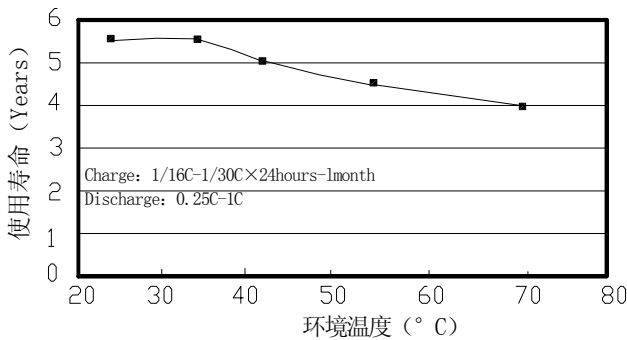
高温镍氢电池不同温度下使用寿命

55°C下不同使用寿命的放电比例

Service life-span of high-temperature Ni-MH battery under different temperature

Life characteristics in stand-by use at 55 °C

55 °C 环境寿命



### 1 序言 PREFACE

此规格书适用于江苏海四达电源股份有限公司的镍氢可充电电池产品。

The specification is suitable for the performance of NI-MH rechargeable battery produced by the JIANGSU HIGHSTAR BATTERY MANUFACTURING CO., LTD.

### 2 型号 MODEL

QNYSC2200mAh High Temperature 1.2V

### 3 外观 APPEARANCE

没有类似变色、污点、电解液泄漏和零伏现象。

There shall be no such details as discoloration or electrolyte leakage or 0 voltage.

### 4 定额 RATINGS

表 1 技术参数

种类 Description	单位 Unit	标准 Standard	条件 Condition
标称电压 Nominal Voltage	V	1.2	单位颗 Unit cell
典型容量 Typical Capacity	min	310	标准充放电 Standard Charge/Discharge
标称容量 Nominal Capacity	mAh	2200	标准充放电 Standard Charge/Discharge
最小容量 Minimum Capacity	min	300	标准充放电 Standard Charge/ Discharge
标准充电 Standard Charge	mA	220(0.1C)	Ta=0~50°C (see note 1)
	hour	15	
涓流充电 Trickle Charge	mA	73(0.03C)~110(0.05C)	Ta=0~70°C (see note 1)
放电截止电压 Discharge Cut-off Voltage	V	1.0	单位颗 Unit cell
贮藏温度 Storage Temperature	°C	-20~+25(within 1 year) -20~+30(within 3 month) -20~+40(within 1 month) -20~+50(within 1 week)	*
典型重量 Typical Weight	g	51.0 approx	*

**5 性能测试 PERFORMANCE**

在进行下列各项测试前每颗电池应用 0.2C 放至 1.0V。如果没有特别规定，测试应在电池交付 1 个月内按以下各项条件进行：

Before proceed the following tests, the cells should be discharged at 0.2C to 1.0V cutoff. Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

环境温度 Ambient temperature:  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$

相对湿度 Relative Humidity:  $65\% \pm 20\%$

注意标准充放电为 Note Standard Charge/Discharge Conditions:

充电 Charge:  $220\text{mA}(0.1\text{C}) \times 15\text{hrs}$

放电 Discharge:  $440\text{mA}(0.2\text{C})$  to 1.0V/cell

**表 2 性能测试**

测试项目 Test	单位 Unit	标准 Standard	条件 Condition	备注 Remarks
容量 Capacity	min	$\geq 300$	标准充放电 Standard Charge / Discharge	允许循环 3 次 Up to 3 cycles are allowed
开路电压 Open circuit Voltage (OCV)	V	$\geq 1.25$	标准充电后 1 个小时内 Within 1 hr after standard charge	单位颗 Unit cell
高倍率放电 High Rate Discharge (1.0C)	min	$\geq 50$	标准充电/休息 30 分钟 用 1.0C 放电至 0.9V Standard Charge/rest 30min discharge at 1.0C to 0.9V	允许循环 3 次 Up to 3 cycles are allowed
过充测试 Overcharge	N/A	没有显著的变形和漏液。 No conspicuous deformation and/or leakage.	0.05C 充电 28 天 0.05C charge for 28 days	*
自放电 Charge reserve	min	$\geq 180\text{min}$	标准充满电后贮藏 28 天， 标准 0.2C 放电 Standard charge Storage: 28 days Standard discharge (0.2C)	1.0V/cell Cut-off
IEC 寿命测试 IEC Cycle Life Test	Cycle	$\geq 50$	IEC61951-2(2003)7.4.1.1	*
振动测试 Vibration	N/A	不起火，不爆炸， 不漏液。 No fire, no explosion or leakage.	充满电的电池进行振动试验。 对电池施以振幅为 0.76mm (双振幅为 1.52mm) 的正弦振动。 -振动频率范围 10Hz~55Hz, -频率变化速率 1Hz/min, -振动时间为 90min $\pm$ 5min, -三个相互垂直的方向上进行。 Fully charged cells are vibration-tested. -A simple harmonic motion is applied to the cells with an amplitude of 0.76mm (a total maximum excursion of 1.52mm).	*

			<p>-The entire range of frequencies:10Hz~55Hz, -The frequency is varied at the rate of 1 Hz/min, -Traversed time :90min±5min, -The vibration is applied in each of three mutually perpendicular.</p>	
外部短路测试 External Short Circuit	N/A	不起火, 不爆炸。 No fire or explosion.	<p>充满电的电池搁置在 20°C±5°C 的环境温度中, 用外部总电阻不高于 100mΩ 的电阻将电池短路。满足下列任意条件时即可停止试验: -电池短路持续 24h -外壳的温度下降了最高温升的 20% Fully charged cells are stored in an ambient temperature of 20°C±5°C,Each cell is then short-circuited by connecting the positive and negative terminals with a total resistance of less than 100mΩ, Stop the test ,whichever is meet -the test lasts 24 hours -the case temperature declines by 20% of the maximum temperature rise.</p>	*
自由跌落测试 Free fall	N/A	不起火, 不爆炸。 No fire or explosion.	<p>充满电的电池三次从 1.0m 高度的位置自由跌落到混凝土地面上, 以此获得随机方向的冲击。 Each fully charged cell is dropped three times from a height of 1.0m onto a concrete floor. The cell are dropped so as to obtain impacts n random orientations.</p>	*
机械冲击测试 Mechanical Shock(crash hazard)	N/A	不起火, 不爆炸, 不漏液。 No fire, no explosion or leakage.	<p>充满电的电池采用刚性固定方法 (该方法能支撑电池所有的固定表面) 固定在试验设备上。在三个相互垂直的方向上各承受一次等值的冲击。至少一个方向垂直于蓄电池的宽面。 测试方法: 在最初的 3ms 内, 最小平均加速度为 75g<sub>n</sub>, 峰值加速度应在 125g<sub>n</sub> 和 175g<sub>n</sub>。 The fully charged cell is secured to the testing machine by mean of a rigid mount. The cell is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face. Test method: -The minimum average acceleration is 75g<sub>n</sub> during initial 3 milliseconds. The peak acceleration shall be between 125g<sub>n</sub> and 175g<sub>n</sub>.</p>	*
强制放电测试 Forced discharge	N/A	不起火, 不爆炸。 No fire and no explosion.	<p>将电池用 0.2C 强迫放电至 1.0V 后转用 1C 强迫放电 90 分钟。 Forced discharge at 0.2C to 1.0V,then the current to be increased to 1C and continue for 90 min.</p>	*

备注 Notes:

1. Ta: 环境温度

Ta: Ambient Temperature

2. 充电时间仅供参考。

Approximate charge time from discharged state, for reference only.

3. 请每隔 3 个月按下面方法激活电池一次:

0.1C 充电 15 小时, 休息 10 分钟, 然后用 0.2C 放电至每颗电池 1.0V, 休息 10 分钟, 0.2C 充电 150 分钟。

please activate the battery once every 3 months according to the following method:

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Manufacturer reserve the right to alter or amend the design, model and specification without prior notice

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Charge at 0.1C for 15 hrs, rest 10 min, then discharge with 0.2C to 1.0V/cell, rest 10 min, then charge at 0.2C to 150min.

## 6 注意事项 PRECAUTIONS TO ENSURE THE SAFETY ON BANDING BATTERY

6.1 电池在使用前必须充电。

Batteries should be charged prior to use.

6.2 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.

6.3 充电方法请参考我们的技术手册。

For charging methods please reference to our technical handbook.

6.4 使用 Ni-Cd 或 Ni-MH 专用充电器。

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

6.5 不要对电池进行反充电。

Do not reverse charge batteries.

6.6 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.

6.7 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.

6.8 不要直接对电池进行焊接。

Do not solder directly to cells or batteries.

6.9 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/overdischarge.

6.10 电池贮存在阴凉干燥处。

Store batteries in a cool dry place.

6.11 不要将 HIGHSTAR 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 HIGHSTAR batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.

6.12 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, overdischarge may occur.

6.13 防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.

6.14 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.

6.15 如出现噪音, 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.

6.16 如电池发烫, 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.

6.17 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.

6.18 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 overdischarge.

6.19 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.

6.20 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.

6.21 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.

6.22 不要将电池放入水中或海水中。

Never put a battery into water or seawater.

6.23 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.

6.24 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 nctact.

6.25 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.

## 7 补充: 循环寿命条款 APPEND: ENDURANCE IN CYCLES

7.1 IEC61951-2 7.4.1.1 电池的循环耐久性 Endurance in cycles

在进行循环测试前, 电池应以 0.2C 放电至 1.0V。然后进行以下的测试, 不考虑电池的型号, 在环境温度  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$  充放电必须保持恒流, 条件如表 4 中描述。在测试过程中注意预防电池温度高于  $35^{\circ}\text{C}$ , 如果需要的话对电池进行强制空气制冷。注意: 实际上是电池的温度, 而不是环境温度决定电池的性能。

表 3 循环测试

循环数	充电	搁置	放电
1	0.1C for 16h	None	0.25C for 2h20min <sup>a</sup>
2 to 48	0.25C for 3h10min	None	0.25C for 2h20min <sup>a</sup>
49	0.25C for 3h10min	None	0.25C to 1.0V
50	0.1C for 16h	1h to 4h	0.2C to 1.0V <sup>b</sup>

如果电池电压低于 1.0V, 可以终止放电。

第 50 次循环的放电时间不少于 3h。

Before the endurance in cycles test, the cell shall be discharged at 0.2C to a final voltage of 1.0V/cell. The following endurance test shall then be carried out, irrespective of cell designation, in an ambient temperature of 20°C ± 5°C. Charge and discharge shall be carried out at constant current throughout, using the conditions specified in table 4. Precautions shall be taken to prevent the cell-case temperature from rising above 35°C during the test, by providing a forced air draught if necessary.

NOTE-Actual cell temperature, not the ambient temperature, determines cell performance.

Table 3 Endurance in cycles

Cycle number	Charge	Stand in Charged condition	Discharge
1	0.1C for 16h	None	0.25C for 2h20min <sup>a</sup>
2 to 48	0.25C for 3h10min	None	0.25C for 2h20min <sup>a</sup>
49	0.25C for 3h10min	None	0.25C to 1.0V/cell
50	0.1C for 16h	1h to 4h	0.2C to 1.0V/cell <sup>b</sup>

a If cell discharge voltage drops below 1.0V/cell, discharge may be discontinued.

Discharge time in 50<sup>th</sup> cycle should be not less than 3h.

## 7.2 IEC61951-2 7.4.2.3 电池的持续充电耐久性 Permanent charge endurance

电池按表 4 规定的条件进行三个步骤的持续充电耐久性试验。

试验由以下步骤组成:

- +40°C 下电池充电接受能力试验;
- +70°C 下电池 6 个月老化周期试验;
- 最后的电池充电接受能力试验, 以检查电池老化后的性能。

注: 选择+70°C 模拟+40°C 下 4 年的持续充电运作。

应用于应急灯上的海四达高温电池使用寿命大于 4 年。

试验之前, 电池先在环境温度 20°C ± 5°C 下以恒流 0.2C 放电至终止电压 1.0V, 并在环境温度+40°C ± 2°C 下搁置 16h~24h。

然后电池按表 18 规定的条件, 分别在环境温度+40°C ± 2°C 和+70°C ± 2°C 下进行恒流充电和放电。

表 4 圆柱型高温电池的持续充电耐久性

循环次数	环境温度	充电	放电 A 或 B <sup>a</sup>	最短放电时间
1	+40°C ± 2°C	0.05C 48h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	无要求
2		0.05C 24h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	3h45min 42min
3		0.05C 24h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	3h45min 42min
4	+70°C ± 2°C	0.05C 60d	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	无要求
5		0.05C 60d	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	
6		0.05C 60d	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	



7	+40°C±2°C	0.05C 48h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	无要求
8		0.05C 24h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	2h30min 24min
9		0.05C 24h	A : 0.2C 放电至 1.0V 或 B : 1.0C 放电至 1.0V	2h30min 24min

放电条件 A 或 B 可按用户的要求进行选择, 电池充电完成后立即进行放电。

在环境温度+40°C下完成第一次充电接受能力试验的 3 次循环后, 电池应在环境温度+70°C±2°C下搁置 16h~24h。

电池在+70°C下进行 6 个月的老化试验期间, 应防止电池外壳温度超过+75°C, 必要时可采取强制通风措施。

实际上决定电池性能的是电池的温度, 而不是环境温度。

记录+70°C下电池 3 次循环的放电时间, 试验期间电池不应发生漏液现象。

在完成老化周期试验后, 电池应在环境温度+40°C±2°C下搁置 16h~24h。然后电池在环境温度+40°C下按表 4 规定的条件重复进行充电接受能力试验的 3 次循环。电池放电时间应不少于表 4 规定的放电时间。

The permanent charge endurance test, shall be performed in three steps according to the conditions specified in Table 4.

——a charge acceptance test at +40°C;

——an ageing period of six months at +70°C;

——a final charge acceptance test to check the cell's performance after ageing.

NOTE: the temperature of +70°C has been selected to simulate four years of permanent charge operation at +40°C.

HIGHSTAR high temperature battery used for emergency lighting will be warranted for 4 years service life..

Prior to this test, the cell shall be discharged at 0.2C at 20°C±5°C to a final voltage of 1.0V and stored, in an ambient temperature of +40°C±2°C, for not less than 16h and not more than 24h.

The cell shall then be charged and discharged at constant current under the conditions specified in Table 4 while maintained in an ambient temperature of +40°C±2°C or +70°C±2°C respectively as appropriate.

**Table 4 Permanent charge endurance for High Temp cylindrical cells**

Cycle number	Ambient temperature	Charge	Discharge A or B <sup>a</sup>	Minimum discharge duration
1	+40°C±2°C	0.05C 48h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	No requirement
2		0.05C 24h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	3h45min 42min
3		0.05C 24h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	3h45min 42min
4	+70°C±2°C	0.05C 60d	A : 0.2C to 1.0V or B : 1.0C to 1.0V	No requirement
5		0.05C 60d	A : 0.2C to 1.0V or B : 1.0C to 1.0V	
6		0.05C 60d	A : 0.2C to 1.0V or B : 1.0C to 1.0V	
7	+40°C±2°C	0.05C 48h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	No requirement

8		0.05C 24h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	2h30min 24min
9		0.05C 24h	A : 0.2C to 1.0V or B : 1.0C to 1.0V	2h30min 24min

The discharge conditions A or B may be chosen to suit the user's requirements. The discharge is carried out immediately on completion of charging.

After performing the first charge acceptance test at +40°C (first three cycles), the cell is stored, in ambient temperature of +70°C ±2°C, for not less than 16h and not more than 24h.

During the ageing period of six months at +70°C ±2°C, precautions shall be taken to prevent the cell-case temperature from rising above +75°C by providing a forced air draught, if necessary.

Actual cell case temperature, not the ambient temperature, determines cell performance.

The discharge duration of the three cycles at +70°C shall be recorded. Leakage of electrolyte shall not occur during this test.

After completion of the ageing period, the cell shall be stored, in ambient temperature of +40°C ±2°C for not less than 16h and not more than 24h. The three cycles at +40°C of the initial charge acceptance test are then repeated using the conditions specified in Table 4. The duration of the discharge shall be not less than the values specified in Table 4.