

# Ni-MH Battery Specification

Model : H400-2/3AAA

Customer Code:

Customer P/N:

Nominal Voltage: 1.2V

Capacity: 400mAh

Draft	Checking	Approved	Customer Confirmation
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## 1. APPLICATION

This specification applies to the Ni-MH batteries.

Model: H400-2/3AAA

## 2. CELL AND TYPE

2.1 Cell	:	Sealed Ni-MH Cylindrical Cell
2.2 Type	:	H400-2/3AAA H*D : 28.0*10.1mm
2.3 Size type:		2/3AAA

## 3. RATINGS

3.1 Nominal voltage	:	1.2	V
3.2 Nominal capacity	:	400	mAh/0.2CmA
3.3 Typical weight	:	7	g (unit cell)
3.4 Standard charge	:	40	mA×15hours
3.5 Rapid charge	:	200	mA×2.4 hours
(with-DV, Time, Temperature control system)			
Trickle current	:	12~20	mA
3.6 Discharge cut-off voltage	:	1	V
3.7 Temperature range for operation	(Humidity: Max. 85%)		
	Standard charge	0~+45°C	
	Rapid charge	+10 ~+40°C	
	Trickle charge	0~+45°C	
	Discharge	-20 ~+65°C	
3.8 Temperature range for storage	(Humidity: Max. 85%)		
	Within 2 years	-20 ~+35°C	
	Within 6 months	-20 ~+45°C	
	Within a month	-20 ~+55°C	
	Within a week	-20 ~+65°C	

## 4. PERFORMANCE

### 4.1 TEST CONDITIONS

The test is carried out with new batteries.

( within a month after delivery )

ambient conditions

Temperature : +20±5°C

Humidity : 65±20%

Note 1

Standard charge : 40mA(0.1C)×15hrs

Standard discharge : 80mA(0.2C) to 1V

## 4.2 TEST METHOD & PERFORMANCE

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥ 400	Standard charge/discharge	up to 3 cycles are allowed
Open Circuit Voltage(OCV)	Voltage (V)	≥1.3	After 1 hour standard charge	
Internal impedance	mΩ/cell	≤50	Upon fully charge (1KHz)	
High rate discharge(1C)	minute	≥ 54(360mAh)	Standard charge before discharge	End Voltage is 1.0V/Cell
Discharge current (C)	A	≤ 1.2(3C)	Maximum continuous discharge current	
Overcharge		no leakage nor explosion	40 mA(0.1C) charge 28 days"	
Charge Retention	mAh	≥240	standard charge; storage: 28 days Standard discharge	
Cycle Life	cycle	≥500	IEC 61951-2(2003) 7.4.1.1	see note 2
Leakage		NO leakage nor deformation	Fully charge 200mA(0.5C), then storage 14 days	

Note 2 IEC 61951-2(2003) 7.4.1.1 cycle life

Cycle number	Charge	Rest	Discharge
1	0.1CmA for 16h	none	0.25CmA for 2.33h
2~48	0.25CmA for 3.17h	none	0.25CmA for 2.33h
49	0.25CmA for 3.17h	none	0.25CmA to 1.0V/cell
50	0.1CmA for 16h	1~4h	0.20CmA to 1.0V/cell

50-cycle test as per above table is repeated . The discharge time of the 100th, 200th, 300th, 400th, 500th should be more than 3 hours respectively. (Ambient temperature is 20±5°C)

### 4.3 Humidity

The cells shall not leak during the 14 days when it is submitted to the condition of a temperature of 33±3°C and a relative humidity of 80±5% (salting is allowed).

## 4.4 Vibration

Cells shall be mechanically and electrically normal after vibration which has an amplitude of 4mm(0.1575 inches) a frequency of 1000 cycles per minute, which should be continued in any directions during 60 minutes

## 4.5 Free Fall

Cells shall be mechanically and electrically normal after being subjected to a drop from a height of 1000mm (3.28ft) onto an oak board in a voluntary axis respectively 1 times.

## 4.6 Short

Cells shall not explode after 1 hour short-circuit test.

## 5. CAUTION

- Be sure to use the recommended charging method for batteries, read the battery charger's instruction manual carefully.
- Be sure to turn off the equipment after use, otherwise may result in leakage of battery fluid.
- After removed from equipment, store 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.
- 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.
- 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.
- Do not use old and new batteries mixed together, or batteries at different charge levels. Do not use the 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.

5.7 As the self-discharge of battery, the temperature of battery will rise when their electric quantity are higher or placed the battery too compact, so please consult the manufacturer about the transport method of battery.

## 6. WARNING

- 6.1 Do not apply water, seawater or other oxidizing reagents to batteries, 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.
- 6.2 Do not over-charge batteries by exceeding the predetermined charging period specified by the battery charger's instructions or indicator. If 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, and explosion. Be sure to handle recharged batteries carefully as they may be not.
- 6.3 Batteries contain a strong colorless alkaline solution (electrolyte). If the skin or clothing comes in contact with fluid from a battery; thoroughly wash the area immediately with clean water

from the tap or another source.

1. Do not remove the outer tube from a battery or damage it. Doing so will expose the battery to the risk of a short circuit, and may cause leakage of battery fluid, explosion and fire.
2. If batteries leak fluid, change color, change shape, or change in any other way, do not use them, otherwise they may cause heat generation, explosion and fire.
3. When the operating time of the battery becomes much shorter than its initial operating time even after recharge, it should be replaced with a new battery as its battery life has ended.

o **DANGER!**

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!

- 7.1 Never dispose of batteries in a fire or heat them.
- 7.2 Do not connect the (+) positive and (-) negative terminals of batteries together with electrically conductive materials, including lead wires. Do not transport or store batteries with their material. Uncovered terminals or connected with a metal necklace or other electrically conductive. When carrying or storing batteries, use a special case.
- 7.3 Only charge batteries using those specific chargers that satisfy battery specifications. Only charge batteries under the conditions specified by the manufacturer.
- 7.4 Never disassemble batteries. Doing so may cause an internal or external short circuit or result in exposed material of battery reacting chemically with the air. It may also cause heat generation, explosion and fire. Also, this is dangerous as it may cause splashing of alkaline fluid.
- 7.5 Never solder lead wires directly on to batteries.
- 7.6 The (+) positive and (-) negative terminals of batteries are predetermined. Do not force the terminals to connect to a charger or equipment. If the terminals cannot be easily connected to the charger or the equipment, check if the (+) and (-) terminals are incorrectly positioned.
- 7.7 The gas release vent which release internal gas is located in the (+) positive terminal of the battery. For this reason, never deform this section or cover or obstruct it. Do not directly connect batteries to a direct power source or the cigarette lighter socket in a car.
- 7.8 Do not use batteries in any equipment other than those specified by the manufacturer.
- 7.9 Batteries contain a strong colorless alkaline solution (electrolyte). The alkaline solution is extremely corrosive and will cause skin damage. If any fluid from a 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.
- 7.10 When batteries are to be incorporated in equipment or housed within a case, avoid air-tight structures, as this may lead to the equipment or the case being damaged .