

## SPECIFICATION

### SEALED RECHARGEABLE NICKEL METAL HYDRIDE BATTERY

#### 1. Scope

This specification can be applied to nickel metal hydride single battery.

Model No.: LTT-AA1600mAh 1.2V

Single battery type: AA

This specification suits to the cylindrical batteries listed below:

A. Single battery nominal voltage: 1.2V.

B. Battery pack voltage can be got by one single cell voltage multiply the quantity of the single cells.

#### 2. Ratings

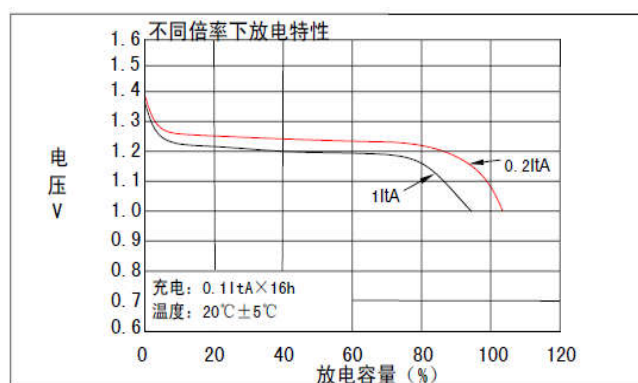
Item	Specification	Conditions
Standard charge	160 mA (0.1C)	ambient temperature of 20±5℃, Relative Humidity: 65±20%
	16 hrs	
Standard discharge	320 mA (0.2C)	standard charge, the final voltage is 1.0V
Rapid Charge	800mA (0.5C)	-ΔV=5~10mV ambient temperature of 20±5℃, Relative Humidity: 65±20%
Rapid discharge	800mA (0.5C)	standard charge, the final voltage is 1.0V
Trickle Charge	32~80 mA (0.02C~0.05C)	Ta=-10~45℃
Storage Temperature	Within 1 year	-20~25℃
	Within 6 months	-20~35℃
	Within 1 months	-20~45℃
	Within 1 week	-20~55℃
Operation Temperature	Standard charge	15~25℃
	Fast Charge	0~45℃
	Discharge	-20~65℃
Nominal Voltage	1.2 V	
Open circuit voltage	≥ 1.25V	Within 1 hr after standard charge
Rated Capacity	1600 mAh	
Minimum Capacity	≥1600 mAh(0.2C)	Standard charge and Standard discharge
	≥1440 mAh(0.5C)	Standard charge and Rapid discharge
Internal Impedance	≤30mΩ	Within 1 hr after standard charge
Weight	约 23g	Approx:23 g
Charge-retention Rate	Rate of Charge-retention≥6 0% of Rated Capacity (960mAh)	Storage a period of 28 days after standard charge, then Standard discharge (0.2C) to 1.0V
Cycles Test	≥ 500 Cycles	IEC61951-2:2003 (see note 2)
Constant humidity and hot performance	不坏损 No damage	Full charge the battery at current 0.1C, 33±3℃, 80±5%R.H., storage 14 days.

Over-charge	No leakage nor explosion Capacity $\geq$ 100%	0.2C discharge to <u>1.0V</u> , 0.1C charge for 48 hrs, then test the Capacity with Standard discharge Conditions
Over-discharge	80%。 No leakage nor explosion Capacity $\geq$ 1280mAh	0.2C discharge to <u>1.0V</u> ,Combine the battery with a <u>3.75<math>\Omega</math></u> electric resistance, after stored for a period of 24 hrs, then test the Capacity with Standard discharge Conditions
Vibration Test	Voltage variety: $\leq$ 0.03V/cell Internal impedance: $\leq$ 5m $\Omega$ /cell	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.
Drop Test	$\leq$ 0.03V/只 $\leq$ 5m $\Omega$ /只	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
Safety	No disrupt or burst, explosion, but leakage of electrolyte and deformation are acceptable	The battery shall undergo a forced discharge in an ambient temperature of $20\pm 5^\circ\text{C}$ , at a constant current of $0.2I_t$ A, to a final voltage of 0V.the current shall then bi increased to $1.0I_t$ A and the forced discharge continued in the same ambient temperature of $20\pm 5^\circ\text{C}$ , for 60 min.

### 3. Specifications of single cell

TYPE	Nickel-Metal Hydride cylindrical single cell	
MODEL	LTT- AAP1600mAh 1.2V	
Dimensions	diameter	14.5-0.7mm
	Height	50.0-1.0mm

### 充放电特性(characteristic of charge/discharge):



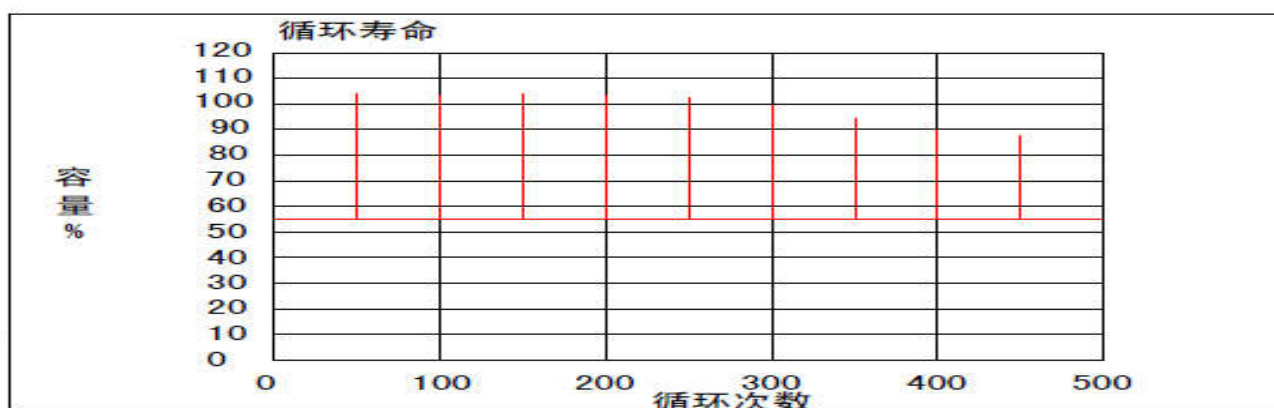
Note 1: 标准充放电. Standard charge and Standard discharge

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

(2). IEC standard recycling life

Cycle Number	Charge	Stand in charged condition	Discharge
1	0.1C×16hrs	None	0.25C×2hrs 20min
2~48	0.25C×3hrs 10min	None	0.25C×2hrs 20min
49	0.25C×3hrs 10min	None	0.25C to 1.0V/ cell
50	0.1C×16hrs	1~4hr	0.20C to 1.0V/cell

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



#### 4、Quality guarantee period

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 1.0V/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 1.0V/cell, then charge the battery at 0.1C for 15 hours, after that place for 20mins, discharge the battery at 0.2C to 1.0V/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.

#### 5. Cautions

- Batteries should be charged prior to use.
- When using a new battery for the first time or after long term storage, please fully charge the battery before use.
- For charging methods please reference to our specifications.
- Use the correct charger for Ni-Cd or Ni-MH batteries.
- Do not reverse charge batteries.
- Do not short circuit batteries, permanent damage to batteries may result.
- Do not incinerate or mutilate batteries, may burst or release toxic material.
- Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive Overcharge / over discharge.
- Store batteries in a cool dry place.
- Do not mix VIGORPOWER batteries with other battery brands or batteries of a different chemistry such as Alkaline and zinc carbon.
- Do not mix new batteries in use with semi-used batteries, over discharge may occur.

12. 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.
13. When connecting a battery pack to a charger, ensure correct polarity.
14. If find any noise, excessive temperature or leakage from a battery, please stop its use.
15. When the battery is hot, please do not touch it and handle it, until it has cooled down.
16. Do not remove the outer sleeve from a battery pack nor cut into its housing.
17. When find battery power down during use, please switch off the device to avoid over discharge.
18. When not using a battery, disconnect it from the device.
19. Unplug a battery by holding the connector itself and not by pulling at its cord.
20. After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
21. Never put a battery into water or seawater.
22. During long term storage, battery should be charged and discharged once every 3 months.
23. 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.
24. Keep away from children. If swallowed, contact a physician at once.