



## Specification Approval Sheet

**Name:** Nickel-Metal Hydride Battery

**Model:** 10003

**SPEC:** 8.4V (9V size) 200mAh LSD Cell

**File Number:**/

**Project:** /

Approved By	Checkup	Make
Andy	/	Haixia Bi
2016-7-13	/	2016-7-13

Customer Confirmation	Signature	Date
	Company Name :	
	Stamp :	

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### Amendment Records

Revision	Description	Issued Date	Approved By
A/0	New release	2016-5-23	Haixia Bi
A1	Update the battery performance parameters	2016-7-13	Haixia Bi



## 1 Scope

This document describes the performance characteristics and testing methods for Nickel-Metal Hydride battery produced by Tenergy Corporation.

## 2 Product type and model number

### 2.1 Product type

Nickel-Metal Hydride Battery

## 3 Rated performance

**Form 1: Battery rated performance**

No	Item	Rated performance	Remark
1	Rated capacity	Nominal 200mAh Min 200mAh-5%	Standard discharge after standard charge
2	Nominal voltage	8.4V	Mean operation voltage during standard discharge after standard charge
3	Voltage at end of discharge	7V	Discharge cut-off voltage
4	Charging voltage	10.5V	
5	Impedance	$\leq 750 \text{ m}\Omega$	
6	Standard charge	Constant current 0.1 C <sub>5</sub> A Constant voltage 10.5V Cut-off current $\leq 0.03C_5A$	
7	Standard discharge	Constant current 0.2 C <sub>5</sub> A End voltage 7V	
8	Fast charge	Constant current 0.5C <sub>5</sub> A Constant voltage 10.5V Cut-off current $\leq 0.03C_5A$	
9	Fast discharge	Constant current 0.5 C <sub>5</sub> A End voltage 7V	
10	Maximum continuous discharge current	2C	
11	Operation temperature range	Charge: 0~45°C Discharge: -20~50°C	65±20%R.H
12	Cycle life	>500cycles	IEC61951-2(2003)7.4.1.1
13	Storage temperature	$\leq 1$ month: -20 ~ 60°C $\leq 3$ months: -20 ~ 40°C $\leq 1$ year: 20 ~ 30°C	65±20%R.H, Best 10~25°C for long-time storage
14	Weight	Approx: $\approx 36\text{g}$	
15	Dimension(mm)	Thickness*Width*Height(Max)	16.5*26*48mm
16	output wire length (mm)	Excluding the connector	/±5mm



**4 Electrical performances**

**Form 2: Battery electrical performances**

**Table 5-Endurance in cycles**

No	Items	Test procedure	Requirements
1	Nominal voltage	The average value of the working voltage during the whole discharge process.	8.4V
2	Discharge performance	The discharge capacity of the battery, measured with 0.2 C <sub>5</sub> A down to 7V within 1 hour after a standard charge at 25±5 °C	Discharge ≥Minimum capacity
3	Capacity retention	Standard charge, storage for 28 days, standard discharge at 45 °C	≥80%
		Standard charge, storage for 1 year, standard discharge at 20 °C	≥80%
4	Cycle life	IEC61951-2(2003)/7.4.1.1	>500cycles

Notes: IEC61951-2(2003)/7.4.1.1 Cycle Life Test:

Cycle number	Charge	stand in Charged condition	Discharge
1	0.1 C <sub>5</sub> A, 16h	none	0.25 C <sub>5</sub> A ,2h 20min
2—48	0.25 C <sub>5</sub> A, 3h10min	none	0.25 C <sub>5</sub> A ,2h 20min
49	0.25 C <sub>5</sub> A, 3h10min	none	0.25 C <sub>5</sub> A to 1.0V/cell
50	0.1 C <sub>5</sub> A, 16h	1h-4h	0.2 C <sub>5</sub> A to 1.0V/cell
Cycle 1 to 50 shall be repeated until the discharges duration on any 50th cycle becomes less than 3hrs			

**5 Standard test conditions**

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 20±5°C and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30°C and humidity 25~85%RH.

**6 Cautions in use**

To ensure proper use of the battery please read the manual carefully before using it.

**6.1 Handling**

Do not expose to, dispose of the battery in fire.

Do not put the battery in a charger or equipment with wrong terminals connected.

Avoid shorting the battery.

Avoid excessive physical shock or vibration.



Do not disassemble or deform the battery.

Do not immerse in water.

Do not use the battery mixed with other different make, type, or model batteries.

Keep out of the reach of children.

## **6.2 Charge and discharge**

Battery must be charged in appropriate charger only.

Never use a modified or damaged charger.

Do not leave battery in charge over 24 hours.

## **6.3 Storage**

Store the battery in a cool, dry and well-ventilated area.

## **6.4 Disposal**

Regulations vary for different countries, Dispose of in accordance with local regulations.

## **7 Battery operation instruction**

### **7.1 Charging**

Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.

Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

Charging temperature: The battery must charge in the ambient temperature scope which this specification book stipulated. Use the constant electric current and constant voltage to charge. Do not reverse charge. When the positive electrode and the cathode meet together, damage can be made for the battery.

### **7.2 Discharging current**

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

### **7.3 Electric discharge temperature**

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

### **7.4 Over-discharges**

Short time of excessively discharge will not affect the usage. But the long time excess discharge can damage the battery performance and cause the function losing. When the battery is not used for a long time, because of its automatic flashover characteristic, it may excessively discharges. To prevent excessively discharge occur, the battery should maintain certain electric quantity.

### **7.5 Storing the batteries**

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

## **8 Other the chemical reaction**

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may



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indicate it is time to change the battery.

**9 Note**

Any other items which are not covered in this specification shall be agreed by both parties.