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# SPECIFICATION OF BATTERY

**Customer:** \_\_\_\_\_

**Type:** Ni-MH Cylindrical Battery

**Model No.:** MH-9V250

**Spec. No.:** \_\_\_\_\_

**Part. No.:** \_\_\_\_\_

**Prepared:** Sunbangqiang

**Approved:** Shangyanli

**Date:** 2012-09-25

## Data Sheet

System ----- Sealed rechargeable  
Ni-MH cylindrical Battery

Type ----- MH-9V250

Specification ----- AAAAA × 7

Nominal voltage ----- 8.4V

Weight approx. ----- 43 g (for reference only)

### Capacity (20°C, 0.2 C to 7.0V)

Typical ----- 260 mAh (for reference only)

Min. ----- 250 mAh

### Charging conditions (20°C)

Standard charge ----- 25 mA × 16 hrs

Fast charge\* ----- up to 250 mA

(DT/dt=0.8~1°C /min,  $-\Delta V=0-5$  mV/cell, TCO=45-50 °C, Timer=110%)

Permanent charge ----- 7.5 mA to 12.5 mA

Max. overcharge current ----- 25 mA (up to 1 year)

### Discharge conditions

Discharge cut-off Voltage ----- 7.0 V

Max. discharge current (continuous) ----- 750 mA

### Storage temperatures (relative humidity : 65 ± 20%)

Storage(1 year) ----- -20°C to + 25°C

Storage(6 month) ----- -20°C to + 35°C

Storage(1 month) ----- -20°C to + 45°C

Storage(1 week) ----- -20°C to + 55°C

### Operation temperatures (relative humidity : 65 ± 20%)

Discharge ----- -20°C to +60°C

Standard charge ----- 0°C to +45°C

Fast charge ----- +10°C to +40°C

Permanent charge ----- 0°C to +45°C

## 1. CHARACTERISTICS

Unless special stated, tests should be carried out within one month of delivery.

Ambient conditions:

Ambient Temperature:  $20 \pm 5^{\circ}\text{C}$

Relative Humidity:  $65 \pm 20\%RH$

Notes:1) Standard charge/discharge

Charge:  $25 \text{ mA (0.1It)} \times 16 \text{ hr}$

Discharge:  $50 \text{ mA (0.2It) to } 7.0V$

2) Except special explaining, the battery shall not leakage and PVC shall not breakage during the test.

Test Items	Test Conditions	Requirements	Remark
Capacity	Standard Charge and Discharge	Discharge Capacity: $\geq 250 \text{ mAh}$	Up to three cycles are allowed
Open-circuit Voltage (OCV)	Voltage between the battery terminals shall be measured within 1 hour after standard charge	$\geq 8.75V$	
High-rate discharge(1It)	After standard charge, rest for 1 hour before discharge to 7.0V at 250 mA current	$\geq 50 \text{ minutes}$	Up to three cycles are allowed
Internal impedance(Ri)	Upon fully charge (1KHZ)	$\leq 900m \Omega / \text{pack}$	
IEC cycle life	IEC61951-2/2003 7.4.1.1(See Remark 1)	$\geq 1000 \text{ cycles}$	
Self- discharge	Standard charged ,stored for 180days below $20^{\circ}\text{C}$ , then standard discharge to 7.0V	Discharge Capacity: $\geq 85\% \text{ original capacity} \star$	
	Standard charged ,stored for 360days below $20^{\circ}\text{C}$ , then standard discharge to 7.0V	Discharge Capacity: $\geq 80\% \text{ original capacity} \star$	
Over-charge	Charge at 25 mA (0.1 It) for 1 year.	No leakage, nor disrupt, nor burst.	
Over- discharge	(1) Standard charge and discharge for 3cycles , (2) Conducted with constant load resistor $168 \Omega$ for 3days (3) Then standard charge and discharge	Discharge Capacity: $\geq 80\% \text{ original capacity}$	Up to three cycles are allowed

Test Items	Test Conditions	Requirements	Remark
Vibration resistance	Standard charge. Then leave for 24 hours, check cell before / after vibration. Amplitude: 1.5 mm Vibration: 3000 CPM	Change of voltage $\Delta V < 0.02V / \text{cell}$ Change of internal impedance $\Delta R < 5 \text{ m}\Omega / \text{cell}$	Any direction for 30 minutes
Drop resistance	Charge the battery at 0.1It for 15hours. Then leave for 24 hours, check battery before / after dropped. Height: 100 cm Thickness of the wooden board : 30 mm	Change of voltage $\Delta V < 0.02V / \text{cell}$ Change of internal impedance $\Delta R < 5 \text{ m}\Omega / \text{cell}$ No breakage except impact point for PVC sleeves	Direction is not specified, Test for 3 times
Safety	The Reverse-charge is conducted for 60 minutes at current of 1.0It after pre-discharge at 0.2 It current to 0V	The battery shall not explode, but leakage & deformation are acceptable	
External Short Circuit	After standard charge, short circuit the cell at 20+/-5°C until the cell temperature returns to ambient temperature. (The resistance of the inter-connecting circuitry shall not exceed 0.1ohm.)	The battery shall not fire and explode, but leakage & deformation are acceptable	External Short Circuit

★ If the ambient temperature is changed, the date may be different from the above value.

**\*REMARK:**

**1. Cycle life:** IEC61951-2(2003) 7.4.1.1

Cycles	Charge	rest	Discharge
1	0.1I <sub>t</sub> × 16hrs	0	0.25 I <sub>t</sub> × 2hrs 20mins
2-48	0.25 I <sub>t</sub> × 3hrs 10mins	0	0.25 I <sub>t</sub> × 2hrs 20mins
49	0.25 I <sub>t</sub> × 3hrs 10mins	0	0.25 I <sub>t</sub> to 1.0V/cell
50	0.1 I <sub>t</sub> × 16hrs	1~4hrs	0.20 I <sub>t</sub> to 1.0V/cell
Repeat 1 to 50 cycles, until the discharge time of any 50 <sup>th</sup> cycle is less than 3hrs			

**2. COSMETIC**

Batteries should be without any flaw、stain、discoloration or leakage and deformation.

**3. CAUTION:**

- 3.1 Do not dispose of cell into fire or dismantled under any condition.
- 3.2 Do not mix different cell types and capacities in the same battery assembly.
- 3.3 Charge and discharge under specified ambient temperature recommend to specification
- 3.4 Short circuit leading to cell venting must be avoided.
- 3.5 Never solder onto cell directly.

3.6 Cell reversal should be avoided.

#### **4. NOTICE:**

- 4.1 Use batteries in extreme condition may affect the service life, such as: extreme temperature 、 deep cycle、 extreme overcharge and over discharge.
- 4.2 Batteries should be stored in a cool, dry place
- 4.3 Once problems be found, stop using, send batteries to local agent.

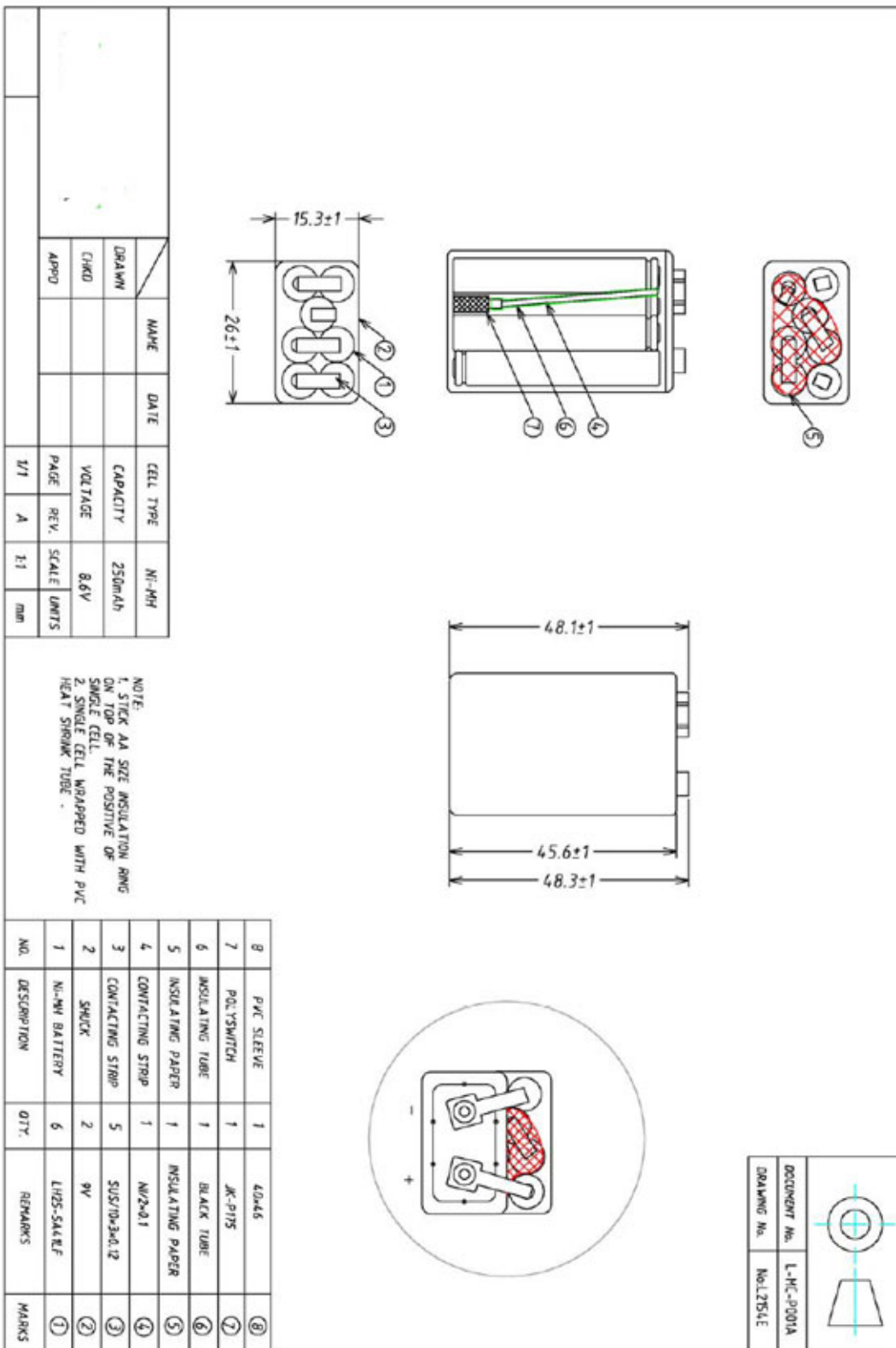
#### **5. STORAGE:**

- 5.1 It is strongly recommended to stored Ni-MH batteries and cells in the temperature range from  $-20^{\circ}\text{C}$  to  $35^{\circ}\text{C}$ , and in low humidity and no corrosive gas environment, to maintain a reasonably high capacity recovery level.
- 5.2 Avoid storage higher (e.g.  $35^{\circ}\text{C}$ ), lower temperature than  $-20^{\circ}\text{C}$ , or higher humidity which would result in deterioration or damage to the cells and batteries such as follows:
  - . Permanent capacity loss
  - . Electrolyte leakage resulted from the expansion or shrinkage of organic material inside the cells.
  - . Rust of metal parts.
- 5.3 Up to three full cycles of charge/discharge after long-term storage may need to obtain highest capacity.
- 5.4 Recommended every three months to do a battery release-charging.

#### **6. REFERENCE:**

Please refer to our responsible division in charge if any question on using batteries.

## 7. Battery Pack Graphic



8. REVISED RECORD:

Version	Revise contents	Date
A	/	2012-09-25