

**A. Basic**

Type		Sealed Rechargeable Ni-MH
Model		TY-5/4AAA-700mAh
Size		5/4AAA
Nominal Voltage (V)		1.2
Nominal Capacity (mAh)		700
Dimension	Diameter (mm)	10.5 <sup>+0</sup> <sub>-0.7</sub>
	Height (mm)	49.7 <sup>±0.5</sup>
Standard Charging	Current (mA)	70
	Time (h)	16
Quick Charging	Current (mA)	210
	Time (h)	4
Rapid Charging	Current (mA)	700
	Time (h)	1.2
Operation Temperature(°C)	Standard Charging	0~45
	Rapid Charging	10~40
	Discharging	-20~65
	Storage	-20~35(RH≤85%)
Permanent Charging Current (mA)		21~35
Maximum Discharging Current (mA)(continuous)		2100
Impedance (mΩ)		≤32 (1000Hz)
Discharge Cut-off Voltage (V)		1.00
Charge Retention (20°C)		≥60%
Weight Approx. (g)		15

**B. Test Report**

Tests are carried out within one month of delivery under the following condition:

**1. Ambient Conditions:**

Room Temperature 20±5 °C

Relative Humidity 65%±20%

**2. Capacity Testing**

**2.1 Standard Charging**

0.2C discharge to 1.00V/cell

0.1C charging for 16 hours

Rest for 1 hours

0.2C discharge to 1.00V/cell.

Within 3 charge/discharge cycles, the capacity is no less than 700 mAh (100%).

**2.2 Quick Charging**

0.2C discharge to 1.00V/cell

0.3C charging for 4 hours

Rest for 1 hours

0.2C discharge to 1.00V/cell.

Within 3 charge/discharge cycles, the capacity is no less than 700 mAh (100%).

**2.3 Rapid Charging**

1C discharge to 1.00V/cell.

1C charging for 72 minutes or -ΔV=10mV/cell.

Rest for 1 hours

1C discharge to 1.00V/cell.

Within 3 charging/discharging cycles, the capacity is no less than 630 mAh (90%).

**3. Open Circuit Voltage (OCV)**

After the battery is fully charged, within 1 hour, the OCV is greater than 1.25V/cell

**4. Internal Impedance**

After the battery is fully charged, within 1 hour, the impedance is not greater than 32 mΩ, as tested by 1000Hz AC source.

**5. Charge Retention**

The fully charged battery is held under temperature of 20±2°C for 28 days, the discharged capacity is no less than 420 mAh (60%).

**6. Overcharging**

Under temperature of 20±5°C, the battery is charged at 0.1C rate for 48 hours. No deformation of the battery can be found. Standard capacity can be attained under normal discharging operation.

**7. Cycle Life**

**7.1 Normal Cycling Test:**

Cycle No.	Charge	Rest	Discharge
1	0.1C × 16hrs	None	0.25C × 2hrs 20mins
2~48	0.25C × 3hrs 10mins	None	0.25C × 2hrs 20mins
49	0.25C × 3hrs 10mins	None	0.25C to 1.00V/cell
50	0.1C × 16hrs	1~4hrs	0.2C to 1.00V/cell
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3hrs			

After 500 cycles of charging/discharging, capacity 420 mAh (60%) can be maintained under the cycling test.

**7.2 Fast cycling test (reference) :**

Charging: 1C for 66 minutes, under -ΔV control (5mV/cell)

Rest: 20 minutes

Discharging: 1C to 1.00V/cell

After 300 cycles of charging and discharging, capacity 420 mAh (60%) can be maintained under the cycling test.

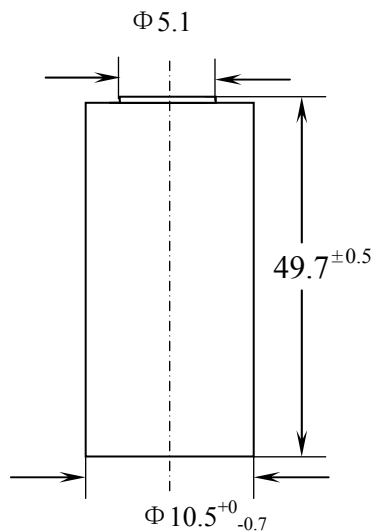


Figure of TY-5/4AAA-700 cell (with tube)

**Note: All the above values subject to change without prior notice.**

**C. Abuse Test**

<b>NO.</b>	<b>Items</b>	<b>Test conditions</b>	<b>Test results</b>
1	Short circuit test	After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours (or with 0.5C for 2.2hours), then shorted for 1hour or longer with a 50~100mΩ load or less	No explosion Temperature is no more than 150℃ on the surface of cell
2	Overcharge test	Cell is discharged with 0.2C to 1.00V, then 0.1C for 48 hours	No explosion Leakage may occur
		Cell is discharged with 0.2C to 1.00V, then 1C for 5 hours	
3	Over discharge test (Forced discharge)	Cell is discharged with 0.2C to 0.00V, then with 1C forced discharged for 1hours	No explosion
4	Shock test (Drop test)	After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours, then cell is dropped 3 times from a 1.9m height onto solid wood (10mm thick) with random orientation	The casing pipe can't rupture, and cell don't deformation, leakage, explosion.
5	Vibration test	Cell is vibrated continuously lengthwise for 60minutes Amplitude: 4mm Frequency: 1000times/minutes	No physical change No leakage Cell electrical performances unchanged
6	High temperature test	After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours (or with 0.5C for 2.2hours), cell is placed to the baking oven which its set-up temperature is 150±5℃	Cell don't explosion before 15 minutes
7	Penetration test (Hole drilling)	After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours or 0.5C for 2.2hours, cell is drilled diameter wise with a 4mm Φ drill at a depth of less than 1mm	No explosion
8	Water immersion test	a. Cell is immersed in water for one month b. Cell is immersed in salt water with a 5% concentration for one month	No explosion

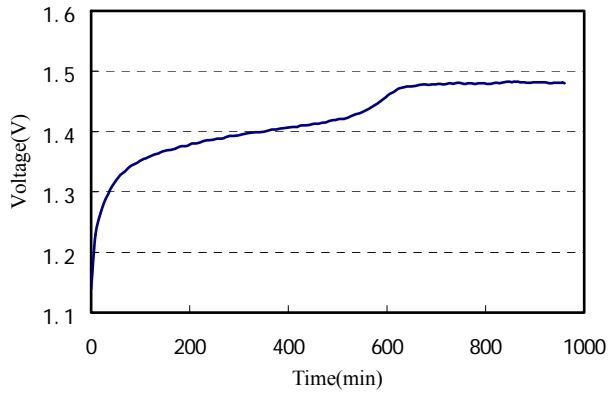


Fig1 0.1C Charging curve

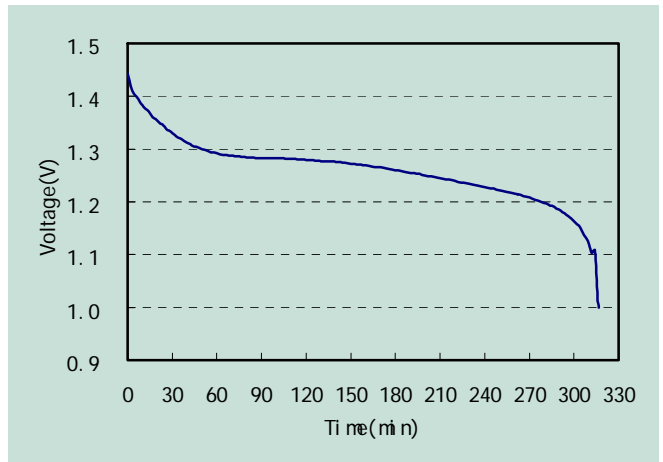


Fig2 0.2C discharging curve

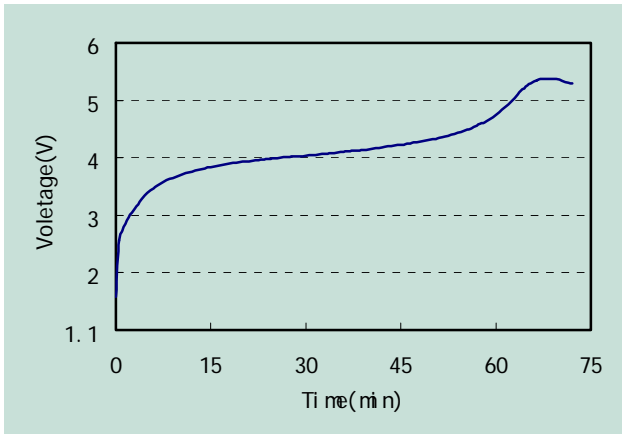


Fig3 1C Charging curve

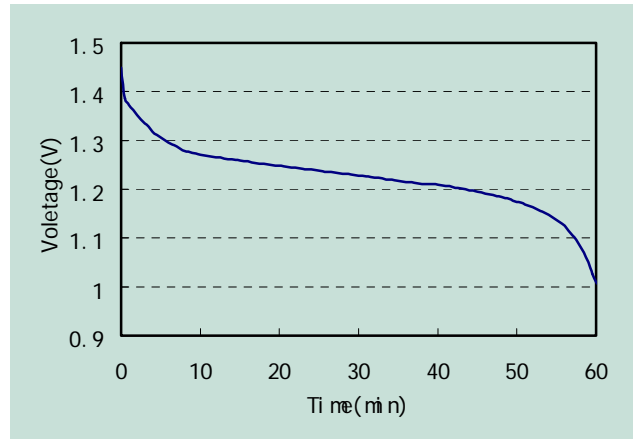


Fig4 1C discharging curve

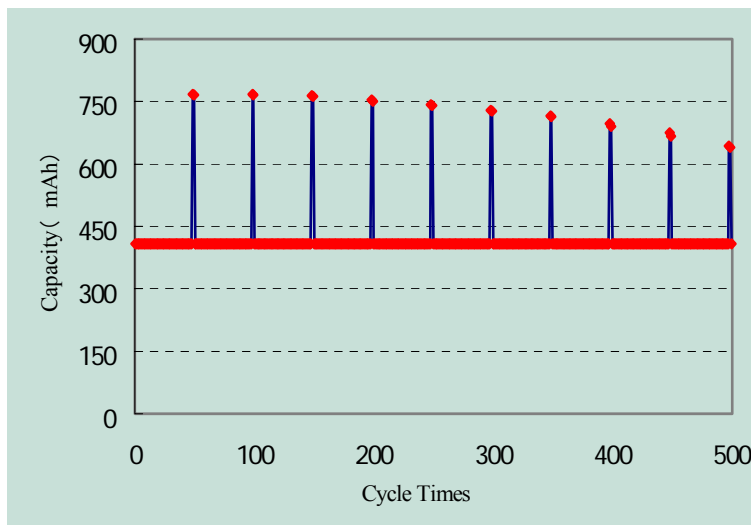


Fig5 Cycle life curve (Normal cycling test)