A. Basic

Type		Sealed Rechargeable Ni-MH
Model		TY-AA-1800mAh(FT)
Size		AA
Nominal Voltage (V)		1.2
Nominal Capacity (mAh)		1800
Dimension	Diameter (mm)	$14.5^{+0}_{-0.7}$
	Height (mm)	$48.1^{+0.5}_{-0.5}$
Standard Charging	Current (mA)	180
	Time (h)	16
Quick Charging	Current (mA)	540
	Time (h)	4
Rapid Charging	Current (mA)	900
	Time (h)	2.4
Operation Temperature(°C)	Standard Charging	0~45
	Rapid Charging	10~40
	Discharging	-20~65
	Storage	-20~35(RH≤85%)
Permanent Charging Current (mA)		54~90
Maximum Discharging Current (mA)(continuous)		3600
Impedance (mΩ)		≤35(1000Hz)
Discharge Cut-off Voltage (V)		1.00
Charge Retention (20°C)		≥70%
Weight Approx. (g)		30

B.Test Report

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

1. Ambient Conditions:

Room Temperature 20±5 ℃

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 1800 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 1800 mAh (100%).

2.3 Rapid Charging

0.5C discharge to 1.00V/cell.

0.5C charging for 144 minutes or -ΔV=10mV/cell.

Rest for 1 hours

0.5C discharge to 1.00V/cell.

Within 3 charging/discharging cycles, the capacity is no less than 1620 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 35 mΩ, as tested by 1000Hz AC source.

5. Charge Retention

The fully charged battery is held under temperature of 20±2ºC for 28 days, the discharged capacity is no less than 1260 mAh (70%).

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 1.0V/cell
50	0.1C × 16hrs	1~4hrs	0.2C to 1.0V/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 1080 mAh (60%) can be maintained under the cycling test.

7.2 Fast cycling test（reference）:

Charging: 0.5C for 132 minutes, under -ΔV control (5mV/cell)

Rest: 20 minutes

Discharging: 0.5C to 1.00V/cell

After 300 cycles of charging and discharging, capacity 1080 mAh (60%) can be maintained under the cycling test.

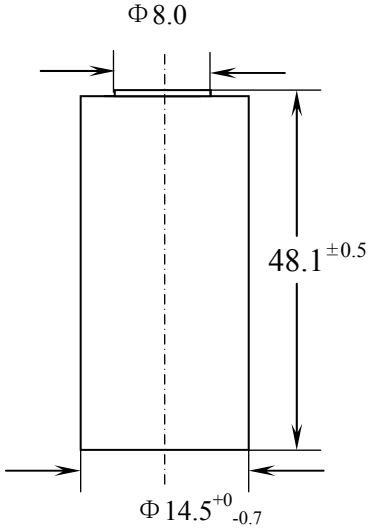

Figure of TY-AA-1800(FT) cell (with tube)

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

C. Abuse Test

NO.	Items	Test conditions	Test results
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

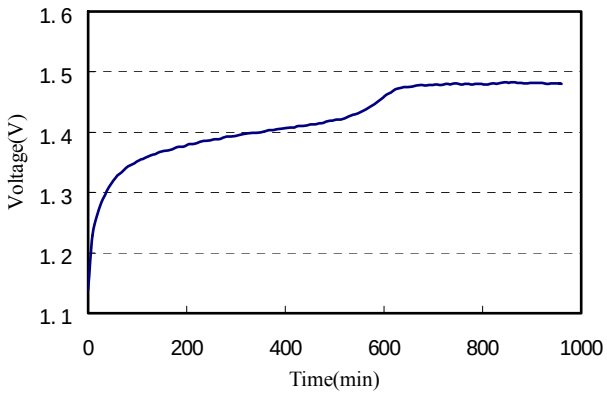

Fig1 0.1C Charging curve

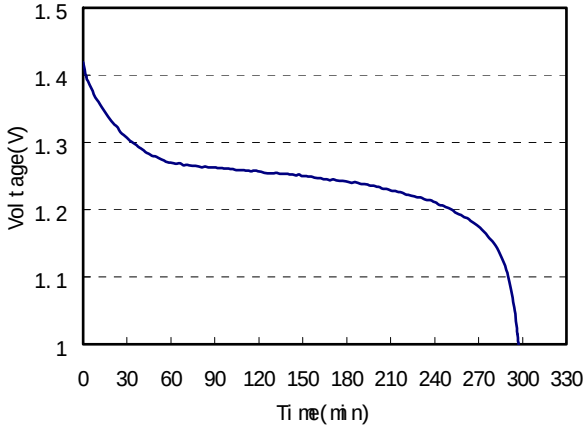

Fig2 0.2C discharging curve

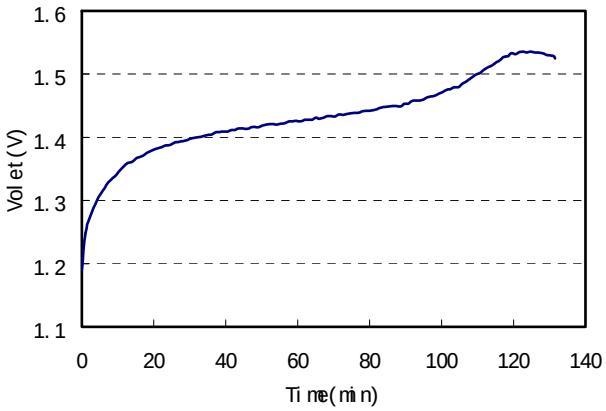

Fig3 0.5C Charging curve

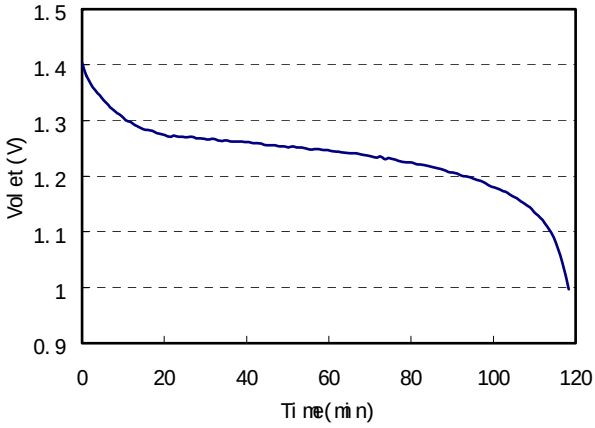

Fig4 0.5C discharging curve

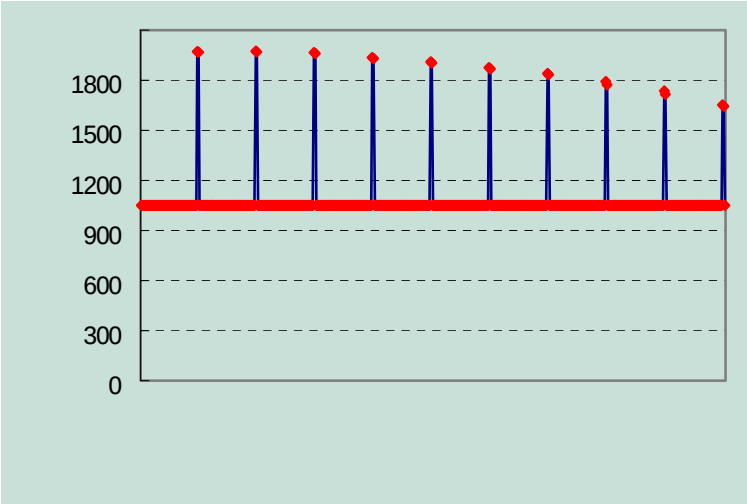

Fig5 Cycle life curve (Normal cycling test)