



## (1) Scope

This specification is applicable nickel metal hydride rechargeable battery. All data involves voltage and weight of stack-up battery pack are equal to the value of unit cell times the number of cells in the battery pack.

Example:

Stack-up battery pack consist of 3 cells

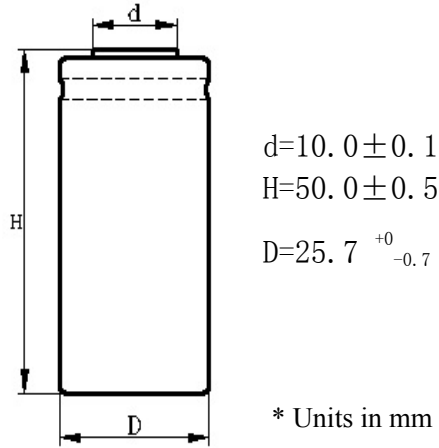
Nominal voltage of one cell = 1.2V

Nominal voltage of stack up battery pack = 3.6V (3 x 1.2V)

## (2) General information

Characteristics		Specification	Remark
Nominal Capacity		4000 mAh	0.1C charge for 16 hrs 0.2C discharge till 1.0V
Nominal Voltage		1.2V	
Charge current	Standard	400mA (0.1C) for 16 hrs	Ambient temp at 0~45°C
	Quick	1200mA (0.3C) for 4 hrs	Ambient temp at 10~40°C
	Fast	2000mA (0.5C) for 2.4hrs	-ΔV=10mV/ cell
	Trickle	120mA (0.03C) to 200mA (0.05C)	Ambient temp at 0~45°C
Discharge current	Standard	800mA (0.2C) till 1.0V	Ambient temp at -20~65°C
	Quick	800mA (0.2C) till 1.0V	
	Fast	2000mA (0.5C) till 1.0V	
Storage temperature	< 1 year	-20 to 35°C	Humidity ≤ 85% RH
	< 3 months	-20 to 45°C	
Internal Impedance (after fully charged)		18 mΩ (max)	Measure at 1k Hz

### (3) Dimension



### (4) Electrical Performance

Unless otherwise specified, tests should be conducted within one month of delivery under conditions of ambient temperature  $20 \pm 5^\circ\text{C}$  and relative humidity:  $65 \pm 20\%$

Test Item	Test Conditions	Requirements
(1) Standard Charge	Charge for 16 hours at constant current of 0.1C after pre-discharge at the constant current of 0.2C until cut-off voltage of 1.0V	N/A
(2) Capacity	Capacity of the charged battery specified in item (1) is measured by discharge the battery at 0.2C until cut-off voltage of 1.0V after rest for 15 minutes. Up to 3 cycles is allowed.	$\geq 3900\text{mAh}$
(3) Open-circuit Voltage	Voltage between terminals of the charged battery specified in item (1) is measured after rest for 1 hour	$\geq 1.25\text{V}$
(4) Initial Impedance (for reference only)	The initial impedance is measured at 1KHz within one hour after standard charge	$\leq 18\text{ m}\Omega$
(5) Charge retention	Standard charge as item (1), store for 28 days, then discharge at 0.2C to 1.0V	$\geq 2400\text{mAh}$
(6) IEC cycle life	According to IEC61951-2 (2003) 7.4.1.1, see note 1	$\geq 500$ cycles
(7) Vibration resistance	Cell is vibrated continuously lengthwise for 60minutes Amplitude: 4mm Frequency: 1000times/minutes	No physical change No leakage Cell electrical performances unchanged

(8) 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	No abruption No leakage No explosion
(9) Over charge test	Cell is discharged with 0.2C to 1.0V,then 0.5C for 5 hours	No explosion Leakage may occur
(10) Over discharge test	Cell is discharged with 0.2C to 0.0V, then with 1C forced discharged for 1 hours	No explosion
(11) High temperature test	After 0.2C to 1.0V,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°C	Cell don't explosion before 15 minutes

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

Cycle no	Charge	Rest	Discharge
1	0.1C X 16h	None	0.25C X 2h20min
2-48	0.25C X 3h10min	None	0.25C X 2h20min
49	0.25C X 3h10min	None	0.25C to 1.0V
50	0.1C x 16h	1-4h	0.2C to 1.0V
Cycles 1 to 50 shall be repeated until the discharge duration of any 50 <sup>th</sup> cycles becomes less than 3hrs			

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**(5) Typical charge/dis-charge curve**

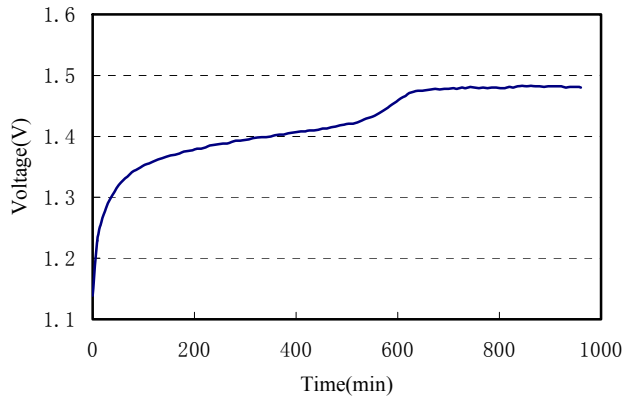


Fig1 0.1C Charging curve

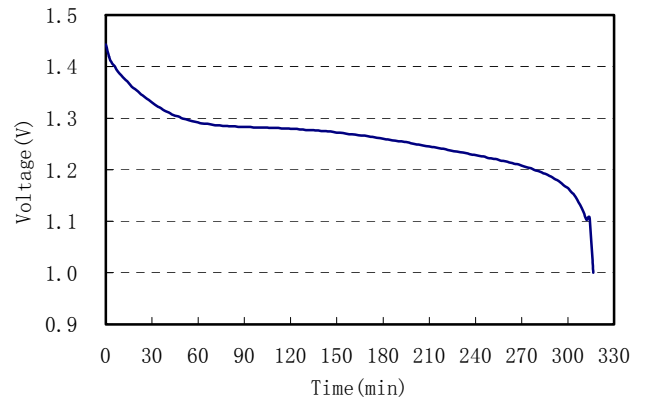


Fig2 0.2C discharging curve

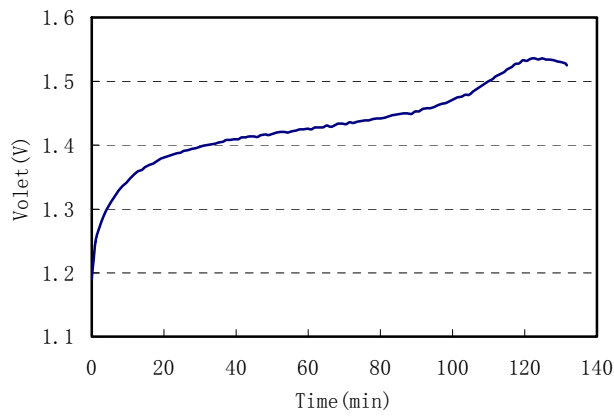


Fig3 0.5C Charging curve

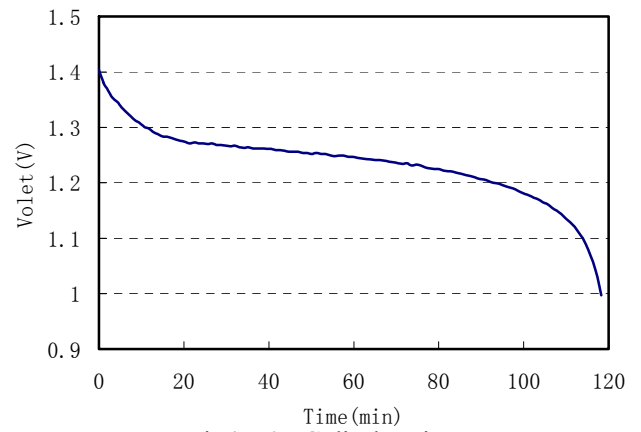











Fig4 0.5C discharging curve

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## (6) Caution

-  Do not reverse charge
-  Charge before use. The cells/batteries are delivered in an uncharged state
-  Do not charge/discharge with more than our specified current
-  Do not short circuit the cell/battery. Permanent damage to the cell/battery may be resulted
-  Do not incinerate or mutilate the cell/battery
-  Do not solder directly to the cell/battery
-  The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge
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-  Manufacturer reserves the right to modify the design, model and specification without prior notice.