



Model No.: X4/5A2200

ENERGY INSIDE NO.: 134057

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1. Scope:

This specification is applied to the reference battery in this Specification and manufactured by SHENZHEN FBTECH CO., LTD.

2. Model:

X4/5A2200

3. Appearance:

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage and deformation.

4. Ratings:

Table below can be taken as the basic guideline of evaluation the battery quality.

4.1 Ambient temperature: $20\pm 5^{\circ}\text{C}$, Relative Humidity: $65\pm 20\%$

4.2 Testing facility must conform to the condition:

Ampere meter: IEC 51/IEC 485 stipulated grade 0.5 or above, including the down-lead resistance totally less than 0.01Ω

Resistance tester: AC 1 KHz sine wave 4 terminals testing equipment

5. General Performance:

Item	Specification	Conditions
Standard charge	220 mA (0.1C) 16 hrs	Ambient temperature of 20±5°C, Relative Humidity: 65±20%
Standard discharge	440 mA (0.2C)	Standard charge, the final voltage is 1.0V, up to 5cycles
Rapid charge	1100 mA (0.5C)	Standard charge, the final voltage is 1.0V, Up to 5cycles
Trickle charge	44~110mA (0.02C~0.05C)	Ta= -10~45°C
Nominal Voltage	1.2V	
Open circuit voltage	>1.25V	Within 1 hr after standard charge
Nominal Capacity	2200 mAh	
Minimum Capacity	>2200 mAh (0.2C) >1980 mAh (0.5C)	Standard charge and Standard discharge Standard charge and Rapid discharge
Internal Impedance	<35mΩ	1KHz sine wave, the factory power≥50%
Charge-retention Rate	Charge retention rate ≥ Nominal capacity 60% (1320mAh)	Storage a period of 28 days at room temperature after standard charge, then Standard discharge (0.2C) to 1.0V
Cycles Test	≥500 cycles	IEC61951-2:2011 (see note 2)

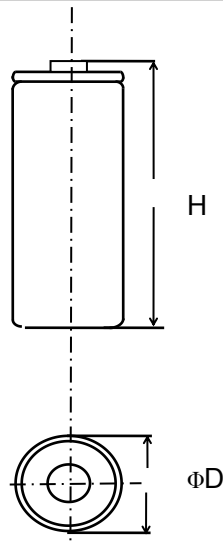
6. Environment Performance:

Storage Temperature	Within 1 year	-20~25°C
	Within 6 months	-20~35°C
	Within 1 months	-20~45°C
	Within 1 week	-20~55°C
Operation Temperature	Standard charge	15~25°C
	Fast charge	0~45°C
	Discharge	0~45°C
Constant humidity and hot performance	No damage	Full charge the battery at current 0.1C, 33±3°C, 80±5%R.H., storage 14 days.

7. Safe Characteristic:

Over-charge	No leakage nor explosion apacity $\geq$ 100%	0.2C discharge to 1.0V, 0.1C charge for 48 hrs, then test the Capacity with Standard discharge Conditions
Over-discharge	No leakage nor explosion Capacity $\geq$ 1760mAh	0.2C discharge to 1.2V, Cornbine the battery with a 2.7 Ω electric resistance, after stored for a period of 24 hrs, then test the Capacity with Standard discharge Conditions
Vibration Test	Voltage variety: $\leq$ 0.03V/cell Internal impedance: $\leq$ 5 m Ω /cell	Charge at current 0.1C for 16 hrs; place for 24 hrs, check the battery before and after vibration. Vibration condition: Swing: 1.5mm, Frequency: 3000CPM, Vibrate for 1hr to any direction.
Drop Test	Voltage variety: $\leq$ 0.03V/cell Internal impedance: $\leq$ 5 m Ω /cell	Charge at current 0.1C fpr 16 hrs; place for 24 hrs, check the battery before and after fall down test; Impact condition: Fall down from height 1.2m to any direction on the hard-wood board (Thickness: 10mm), test for 3 times
Safety	No disrupt of burst, explosion, but leakage of electrolyte and deformation are acceptable	The battery shall undergo a forced discharge in an ambient temperature of 20 $\pm$ 5°C, at a constant current of 0.2 ItA, to a final voltage of 0V. The current shall then bi increased to 1.0 ItA and the forced discharge continued in the same ambient temperature of 20 $\pm$ 5°C, for 60 min.
External Short Circuit	No fire and no explosion	After standard charge, short-circuit the cell at 20°C $\pm$ 5°C until the cell temperature returns to ambient temperature (cross section of the wire or connector should be more than 0.75mm ²).

8. Specification of single cell:

TYPE	Nickel-Metal Hydride cylindrical single cell		unit: mm 
MODEL	FB-MH-4/5AP2200mAh 1.2V		
Dimensions	ΦD	17.0 ^{+0.0} _{-0.7}	
	H	43.0 ^{+0.0} _{-1.5}	

9. Characteristic of charge/discharge:

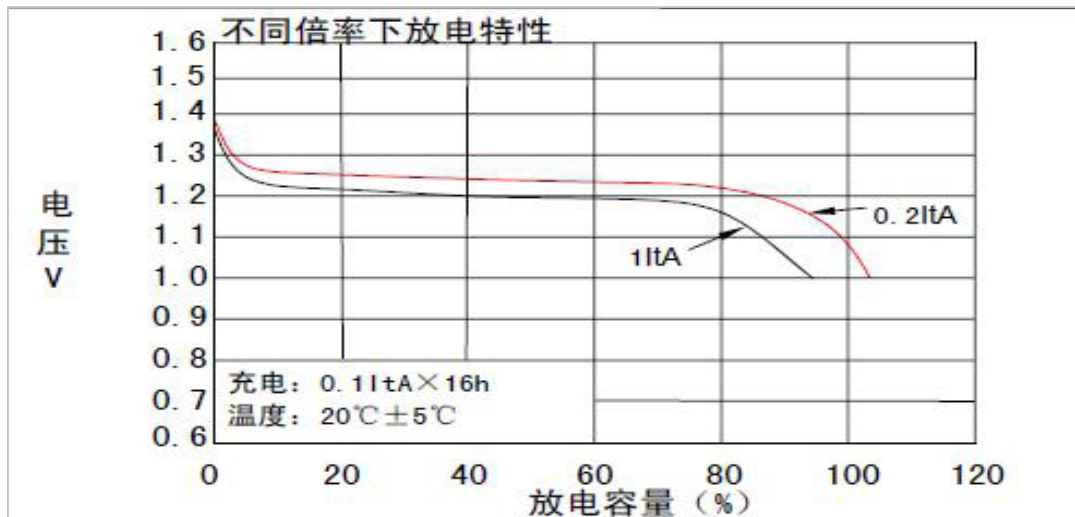
Note 1: Standard charge and Standard discharge

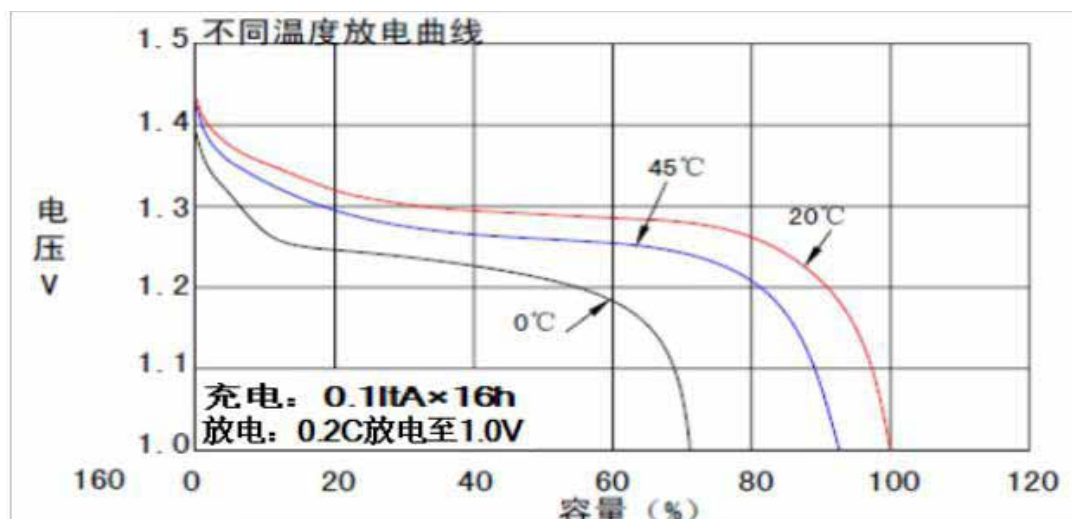
Note 2: Life test method of IEC61951-2:2011

Cycle Number	Charge	Stand in charged condition	Discharge
1	0.1C×16hrs	None	0.25C×2hrs 20min
2~48	0.25C×3hrs 10min	None	0.25C×2hrs 20min
49	0.25C×3hrs 10min	None	0.25C to 1.0V/ cell
50	0.1C×16hrs	1~4hrs	0.20C to 1.0V/ cell

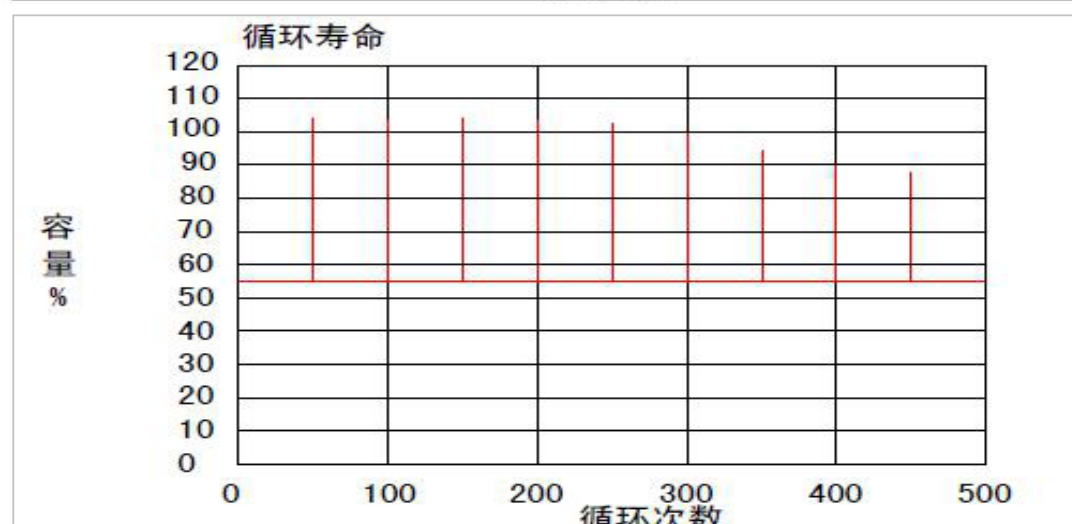
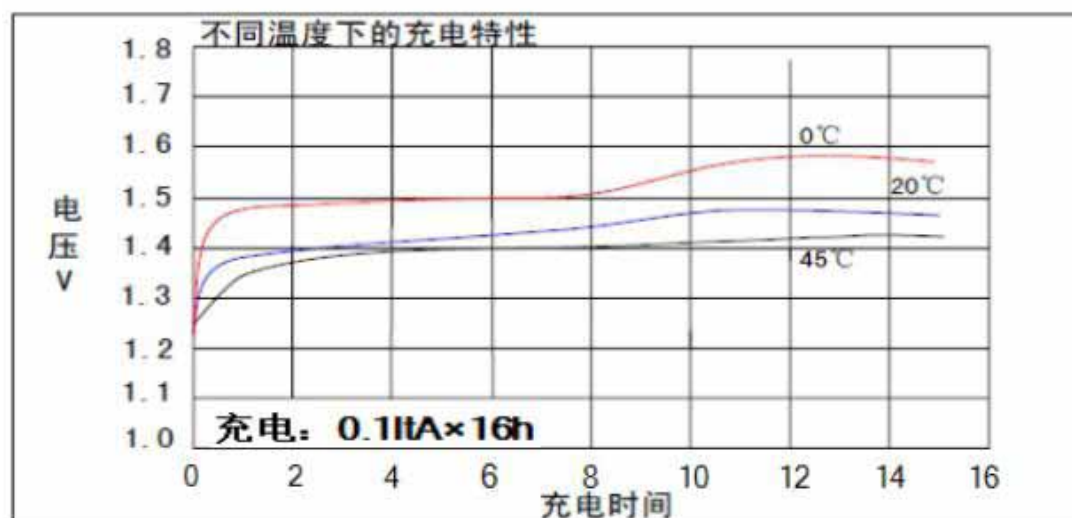
重复 1 至 50 次循环,直至某一第 50 次循环的放电时间少于 3 小时

Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3h. At this stage, a repeat capacity measurement as specified for 50 shall be carried out





特征曲线



10. Quality guarantee period:

Guarantee time for one year due to the processing and raw material defectiveness. Suggestion: The products before delivery would be charged 20-80% capacity according to the transportation distance and packing condition. While checking the capacity, please discharge the battery at 0.2C to 1.0V/cell; then charge and discharge the battery at by standard current. If the storage time over 3 months or above, please discharge the battery at the current 0.2C to 1.0V/cell, then charge the battery at 0.1C for 16 hours, after that place for 20 mins, discharge the battery at 0.2C to 1.0V/cell. After this activation, check the capacity by the standard current charge and discharge the battery. The first time use suggested to take standard charge method to charge the battery to prevent from damage to battery.

11. Transport, Storage:

11.1 Transport:

Batteries should be kept in a clean dry and ventilated environment in the process of transportation, and to prevent violent vibration impact or pressure, prevent the sun and rain, can use the auto train ships and aircraft and other means of transportation.

11.2 Storage:

11.2.1 Temperature and humidity storage:

The battery should be stored at ambient temperature for $-20^{\circ}\text{C}\sim 35^{\circ}\text{C}$. The relative humidity is not more than a clean and dry 85% indoor ventilation. Should avoid contact with corrosive substances. We should keep away from fire and heat source.

11.2.2 Placed way storage:

Batteries stacked layers of boxes of highest do not exceed five layers. In order to ensure good air circulation between the state of the battery box. Please keep box between 5~10cm distance. Prevent battery due to the deposition temperature gathering and cause safety accident.

12. Guard:

In order to prevent from battery effect caused by equipment failures. Ensure that the circuit and battery set of safety. In the design and production equipment, please give full consideration to the following matters, and consider the specification.

NOTE!!!

- 1. Batteries could be charged prior to use.**
- 2. Fast charging method of all should be discussed with our engineer.**
- 3. When using a new battery for the first time of after long term storage, please fully charge the battery before use.**

4. For charging methods please reference to our specifications.
5. Use the correct charger for Ni-Cd or Ni-MH batteries.
6. Store batteries in a cool dry place.
7. When connecting a battery pack to a charger, ensure correct polarity.
8. When not using a battery, disconnect it from the device.
9. During long term storage, battery should be charged and discharged once every 3 months.

WARNING!!!

1. Do not reverse charge batteries.
2. Do not short circuit batteries, permanent damage to batteries may result.
3. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive Overcharge / over discharge.
4. Do not mix XCell batteries with other battery brands or batteries of a different chemistry such as Alkaline and zinc carbon
5. Do not mix new batteries in use with semi-used batteries, over discharge may occur
6. If find any noise, excessive temperature or leakage from a battery, please stop its use.
7. When the battery is hot, please do not touch it and handle it, until it has cooled down.
8. Do not remove the outer sleeve from a battery pack nor cut into housing.
9. When find battery power down during use, please switch off the device to avoid over discharge
10. Do not put the sea water or other oxidation on battery treatment trial, because this will cause the battery to rust and fever. If the battery is rusty, its decompression explosion-proof valve will not work. So it will cause an explosion.
11. Do not over charging XCell NI-MH battery. The preset charging time continue

to charge that is not more than the charger description or indication. Of the XCell Ni-MH Battery charging device preset time after charging is still not full, Please stop charging, prolong the charging time will cause the battery leakage heating and explosion.

12. XCell Ni-MH battery contains colorless alkali solution (that is the electrolyte).

If skin of clothing and XCell NI-MH battery electrolyte contact, please clean with boric acid or acetic acid water, rinse thoroughly with clean water. The battery's electrolyte will corrode the skin.

13. Disable the battery series number exceeds 20. For more than 20 branches of series batteries can cause electric shock leakage or fever.

14. When XCell Ni-MH battery is full of electricity use time is far less the initial work time. The service life of the battery is full, should be replaced with a new battery.

DANGER!!!

1. Do not incinerate or mutilate batteries, may burst or release toxic material.
2. That will not XCell Ni-MH battery positive and negative electrode with conductive material, such as wires connected directly. Do not transport or storage, transportation and storage battery, pay attention not to let the metal key contact conductive house, transport or storage use special too (such as special carton).
3. The prohibition of open XCell Ni-MH battery. Removing the battery will cause the external or internal short circuit. Lead battery components exposed chemical reaction occurred in the air. The explosion of fire will cause fever. Will cause the battery alkali splash, very dangerous.
4. Keep away from children. If swallowed, contact a physician at once

13. Other:

- ☐ The company has to modify the specification does not notify the customer in case of rights.
- ☐ Matters discussed and decided by the supply and demand sided.
- ☐ Not according to the specification of operation caused the accident, the company dies not undertake any responsibility.