NI-MH BATTERIES

SPECIFICATIONS

Specification Approved	PREPARED	
	CHECKED	
	APPROVED	

Customer Approved	CHECKED	
	APPROVED	
	Please sign and return one copy to us	盖章处 Seal the

Power-Xtra reserve the right to alter or amend the design, model and specification without prior notice

Content

1. Modified List

Product Modified Record List

Revision	Date	Mark	Modified Content	Approved

2. (Scope):

This specification is applied to the reference battery in this Specification and manufactured by POWER-XTRA GROUPE LIMITED

3. (Model)：PX-4/5A 2000mAh 1.2V

4. (Appearance):

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

5. (Ratings):

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

5.1 (ambient temperature)20±5℃， (Relative Humidity): 65±20%

5.2 (Testing facility must conform to the condition)：

IEC 51/IEC 485 0.5。0.01Ω

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

6. （General Performance）：

Item	Specification	Conditions
Standard charge	200 mA（0.1C） 16 hrs	ambient temperature of 20±5℃, Relative Humidity: 65±20%
Standard discharge	400 mA (0.2C)	standard charge, the final voltage is 1.0V
Rapid discharge	1000mA（0.5C）	standard charge, the final voltage is 1.0V
Trickle Charge	40～100 mA (0.02C～0.05C)	Ta=-10～45 ℃
Nominal Voltage	1.2 V	
Open circuit voltage	≥ 1.25 V	Within 1 hr after standard charge
Nominal Capacity	2000 mAh	
Minimum Capacity	≥2000 mAh(0.2C) ≥1800 mAh(0.5C)	Standard charge and Standard discharge Standard charge and Rapid discharge
Internal Impedance	≤30mΩ	Within 1 hr after standard charge
Charge-retention Rate	60%(1200mAh) Charge retention rate ≥Nominal capacity 60%(1200mAh)	Storage a period of 28 days after standard charge, then Standard discharge (0.2C) to 1.0V
Cycles Test	≥ 500 Cycles	IEC61951-2:2011 7.5.1.2 （see note 2）

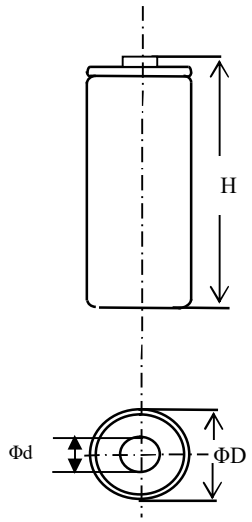
7. Environment Performance:

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

8. Safe Characteristic :

Over-charge	No leakage nor explosion apacity≥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≥1600mAh	0.2C discharge to 1.2V,Cornbine the battery with a 3Ω electric resistance, after stored for a period of 24 hrs, then test the Capacity with Standard discharge Conditions
Vibration Test	Voltage variety: ≤0.03V/cell Internal impedance: ≤5 mΩ/cell	Charge at current 0.1C for 16hrs; 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: ≤0.03V/cell Internal impedance: ≤5 mΩ/cell	Charge at current 0.1C for 16hrs, 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 or burst, explosion, but leakage of electrolyte and deformation are acceptable	The battery shall undergo a forced discharge in an ambient temperature of 20±5℃,at a constant current of $0.2I_tA$,to a final voltage of 0V.the current shall then bi increased to $1.0I_tA$ and the forced discharge continued in the same ambient temperature of 20±5℃,for 60 min.
External Short Circuit	No fire and no explosion	After standard charge, short-circuit the cell at 20℃±5℃ until the cell temperature returns to ambient temperature.(cross section of the wire or connector should be more than $0.75mm^2$)

9. Specifications of single cell:

TYPE	Nickel-Metal Hydride cylindrical single set		unit: MM 
MODEL	PX-4/5AP2000mAh 1.2V		
Dimensions	ΦD	17.0-0.7mm	
	H	43.0-1.5mm	
	Φd	8.0±0.05mm	

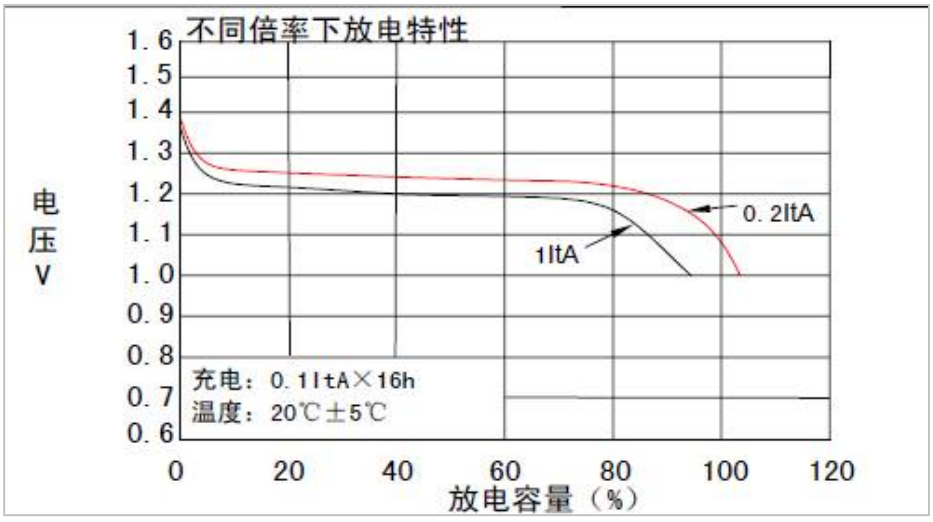
10. Characteristic of charge/discharge:

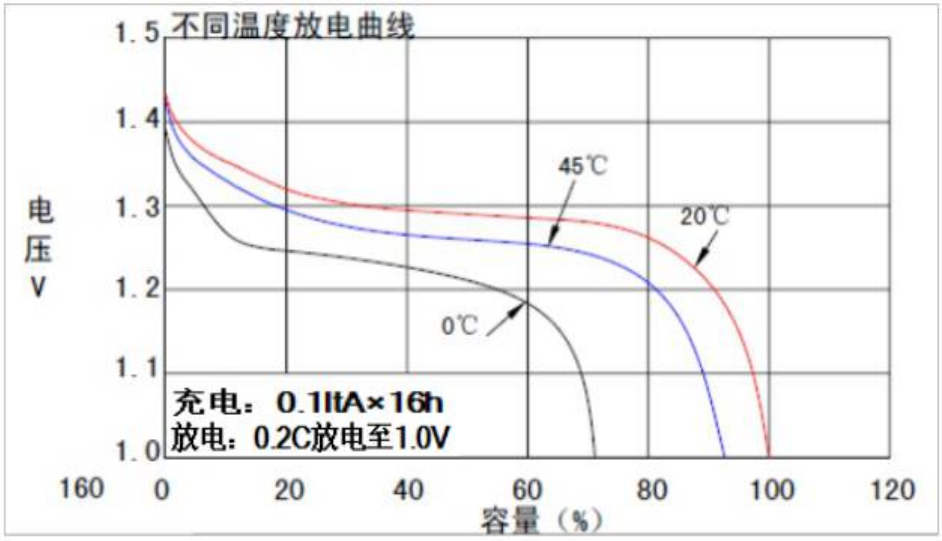
Note 1: Standard charge and Standard discharge

Note 2: (1). Ambient temperature: 20±5℃, Relative Humidity: 65±20%

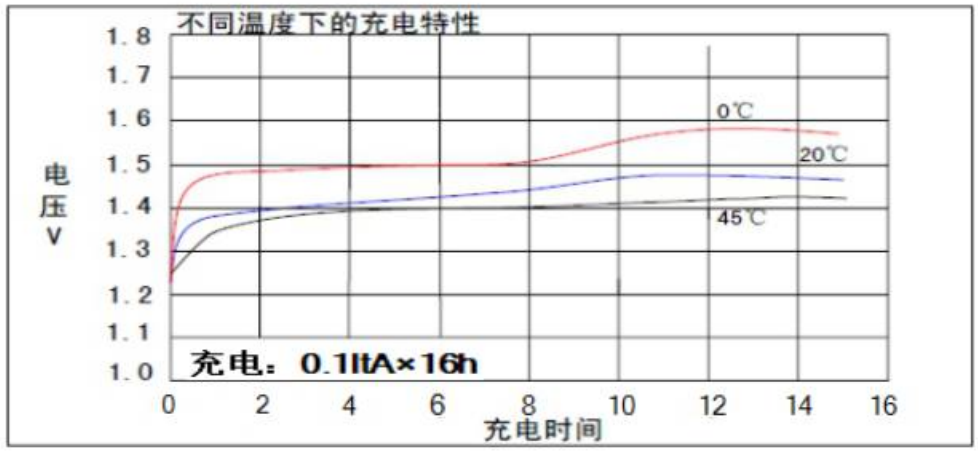
(2). IEC (Life test method of IEC61951-2:2011) ：

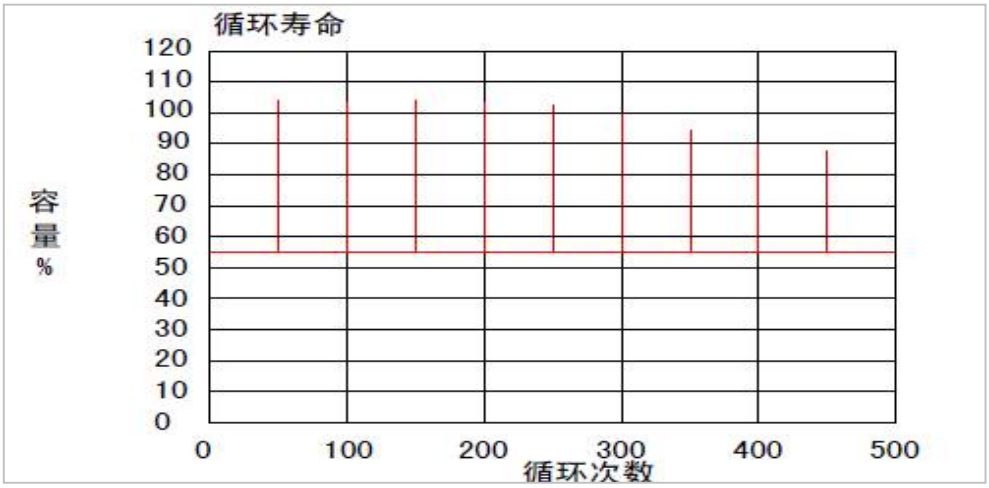
Cycle Number	Charge	Stand in charged condition	Discharge
1	0.1C×16hrs	None	0.25C×2hrs 20min
2~48	0.25C×3hrs 10min	None	0.25C×2hrs 20min
49	0.25C×3hrs 10min	None	0.25C to 1.0V/cell
50	0.1C×16hrs	1～4hrs	0.20C to 1.0V/cell
Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3h.At this stage, a repeat capacity measurement as specified for 50 shall be carried out			




不同温度放电曲线
电压V
1.5
1.4
1.3
1.2
1.1
1.0
45℃
20℃
0℃
充电：0.1ItA×16h
放电：0.2C放电至1.0V
160
0
20
40
60
80
100
120
容量（%）

特征曲线


不同温度下的充电特性
电压V
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0℃
20℃
45℃
充电：0.1ItA×16h
0
2
4
6
8
10
12
14
16
充电时间


循环寿命
容量%
120
110
100
90
80
70
60
50
40
30
20
10
0
0
100
200
300
400
500
循环次数

11. 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 20mins, 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.

12. Transport, Storage：

12.1 (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

12.2（Storage)：

12.2.1（Temperature and humidity storage）：

-20℃~35℃， 85%

The battery should be stored at ambient temperature for -20℃~35℃， 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。

12.2.2（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。

13. 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）：

- Batteries should be charged prior to use.
- Fast charging method of all should be discussed with our engineer.
- When using a new battery for the first time or after long term storage, please fully charge the battery before use.
- For charging methods please reference to our specifications.
- Use the correct charger for Ni-Cd or Ni-MH batteries.
- Store batteries in a cool dry place.
- When connecting a battery pack to a charger, ensure correct polarity.
- When not using a battery, disconnect it from the device.
- During long term storage, battery should be charged and discharged once every 3 months.

（Warning）：

- Do not reverse charge batteries.
- Do not short circuit batteries, permanent damage to batteries may result.
- Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive Overcharge / over discharge.
- Do not mix Power-Xtra batteries with other battery brands or batteries of a different chemistry such as Alkaline and zinc carbon
- Do not mix new batteries in use with semi-used batteries, over discharge may occur
- If find any noise, excessive temperature or leakage from a battery, please stop its use.
- When the battery is hot, please do not touch it and handle it, until it has cooled down.
- Do not remove the outer sleeve from a battery pack nor cut into its housing.
- When find battery power down during use, please switch off the device to avoid over discharge
- 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.
- Do not over charging Power-Xtra Ni MH battery, The preset charging time continue to charge that is not more than the charger description or indication. If the Power-Xtra Ni MH battery charging device preset time after charging is still not full, Please stop charging, Prolong the charging time will cause battery leakage heating and explosion.
- Power-Xtra Ni MH battery contains colorless alkali solution(That is, the electrolyte), If on skin or clothing and Power-Xtra 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.
- Disable the battery series number exceeds 20, For more than 20 branches of series batteries can cause electric shock leakage or fever.
- When Power-Xtra Ni MH battery is full of electricity use time is far less than the initial work time, The service life of the battery is full, Should be replaced with a new battery.

（Danger）:

- Do not incinerate or mutilate batteries, may burst or release toxic material.
- Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
- Unplug a battery by holding the connector itself and not by pulling at its cord
- After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
- Never put a battery into water or seawater.
- Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
- That is not to be Power-Xtra Ni MH battery placed higher than 1.5 meters of easily falling place, do not make it from more than 1.5 meters above the ground, drop
- That will not Power-Xtra Ni MH battery positive and negative electrode with conductive material, Such as wires connected directly. Do not transport or storage, Transportation and storage battery, Transportation and storage battery, pay attention not to let the metal necklace key contact conductive house, Transport or storage use special tool(Such as special carton).
- The prohibition of open Power-Xtra 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.
- Keep away from children. If swallowed, contact a physician at once

14. 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 sides.
- Not according to the specification of operation caused the accident, the company does not undertake any responsibility.