Enekeep Approval Sheet

Note: This Approval Sheet (Version Number:SP07A020XC-2.2E) prepared by Union Suppo Battery (Liaoning)Co., Ltd., is subject to be modified without prior notice.

1. MODEL: HXAA-2200

2.Product Description

HXAA-2000 is a new generation of Nickel Metal Hydride rechargeable battery which combines the advantage of both dry cells and rechargeable batteries,which has higher outpower, higher capacity retention and good discharge performance at low temperature compared with dry battery. It can be used right now after purchasing.

3. SPECIFICATION

·Nominal voltage: 1.2V

·Nominal capacity: 2200 mAh

·Standard charge: 220 mA×12hrs

·Rapid charge: 2050 mA(controlled by at least 3-4 following methods simultaneously);

Delta V = 0--5mV/cell (controlling voltage-decreasing while charging);

$\Delta T/\Delta t$ = 0.8-1 Celsius/min(controlling surface temperature increment);

TCO = 45-50 Celsius(controlling battery surface temperature);

63 min(controlling charging time at constant current).

·Discharge end-voltage: 1.0V

·Max constant current of discharge: 3300 mA(at 20 Celsius)

· Ambient temperature range(humidity: 65±10%)

Standard charge: 0 -- 45 Celsius

Rapid charge: 10--40 Celsius

Discharge: -18-- +55 Celsius

· Storage temperature range(humidity：65±10%)*

Within 12 months: -20 -- +35 Celsius

Within 3 months: -20 -- +45 Celsius

Within 1 month: -20 -- +55 Celsius

*We recommend the best storage temperature is below 20 Celsius if the storage temperature is above 20 Celsius the capacity retention rate can be decreased compared with what we claimed. The battery should keep open. Any conductive connection no matter dircet or indirect will cause a bad effect. When the battery is not in use please put it in the holder, which appends with the battery.

4. Appearance & Dimension/Weight

As per attached drawing

5. Performance Testing

5.1 Test Requirement

Unless otherwise stipulated, all tests are carried out in ambient temperature 20±5 Celsius,humidity 65±10%;Tests should be made within one month after receipt of the battery.

Important: New batteries are delivered in a 100% charged state, discharge to 1.0V/cell before any test!

5.2 Testing Procedure and Standard

Item	Measuring Procedure	Standard
1. Appearance	Visual check	Refusal of dirty, in shape of scratched pack
2. Dimension	Measured by calipers	As per attached drawing
3. Weight	Weighed by balance with precision of 0.1g	appr. 27.0 g
4. Open-circuit voltage	Measure open-circuit voltage 14 days after standard charge	Min 1.29V
5. Capacity	Calculate capacity when discharge at 440 mA to 1.0V /cell，after one hour standard charge	Typical 2150 mAh Min 2050 mAh
6. Impedance	Measure the impedance of battery by applying AC with frequency of 1000Hz within one hour after standard charge (by milliohm meter)	Max 35mΩ
7.Capacity retention(180d)	Lay standard charged battery for 180 days at environmental temperature below20 Celsius, Measure capacity when discharge at 440 mA to 0.9V	typ.retention rate 85%*
Capacity retention(360d)	Lay standard charged battery for 360 days at environmental temperature below20 Celsius, Measure capacity when discharge at 440 mA to 0.9V	typ.retention rate 80%*
8. Over-charge	Charge at 440 mA for 48hrs	No abnormality on appearance and structure should be observed
9. Charge at high temperature	Put the battery in constant temperature box of 40±2 Celsius for 2 hours Charge at 880 mA,3hrs and with -ΔV=10mV/cell rapid charge cut-off control,stand it in ambient temperature of 20±5 Celsius for 1 hour, discharge at 440 mA to 1.0V/Cell	Discharge Capacity 1935 mAh min
10. Low-temperature discharge	Put the standard charged battery in an Constant Temperature Box at 0 Celsius, for 2 hours, discharge at 440 mA to 1.0V/cell	Discharge Capacity 1720 mAh min
11. Over-discharge	Connect standard charged batteries with a resistor of 12Ω/ cell in series for 8 hrs	No deformation
12. Cycle life	As per IEC Standard, inspect the capacity at 500th cycle	Typical min 1290 mAh
13. Humidity test	Put standard charged battery in ambient temperature: 33±3 Celsius humidity:80±5% for 14 days	No deformation No leakage
14. Vibration-proof	Lay the standard charged battery for 1 hour with open-circuit, vibrate the battery Amplitude 4mm Frequence 1000times/min Direction Any Time 60min	Open circuit voltage variation below 0.02V/cell No deformation No leakage
15. Impact-proof	Lay the battery standard charged for 1 hour with open-circuit,drop with the follow conditions: Height: 45cm Target : Hard wood plate Direction: Any direction Times: 3	Open circuit voltage variation below 0.03V/cell No deformation No leakage
16. Safety	Short-circuit the positive and negative polarity for 1 hour using a leading wire of 0.75mm^2	No explosion but leakage or deformation allowed

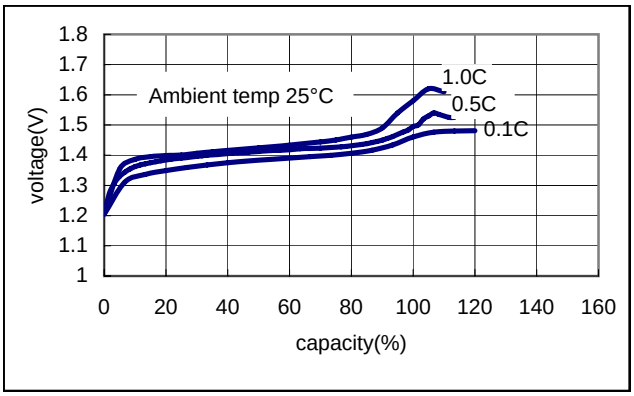
* if the ambient temprature is changed, the data may be different from the above value.

Note: If batteries are properly used, it is kept in seal status, safety vent won't be active. But in case of abuse use such as long time over charge, short circuit, over-discharge etc., battery inner pressure will increase and lead to safety vent open.
when the battery is not in use,turn off the equipment. Read instruction carefully before use.

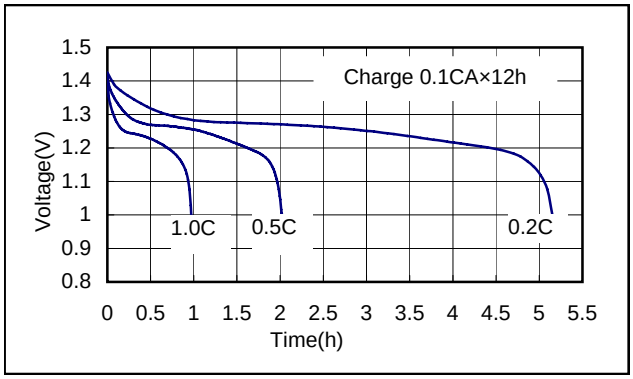
·Parameters

Nominal Voltage		1.2V
Nominal capacity(0.2C)		2200 mAh
Min. capacity		2050 mAh
Dimension	OD(mm)	14.5 (+0/-0.5)
	Height(mm)	50.5
	Weight(g)	27.0
Impedance(1000Hz)		Max 35mΩ
Charge	Standard Charge	220 mA×12hrs
	Rapid Charge (need special control)	2050 mA×63min
Ambient Temperature	Charge	Standard charge：0-45 Deg
		Rapid Charge: 10-40 Deg
	Discharge	-18 -- 55 Deg.
	Storage	1 year: -20-35 Deg.
		3 months: -20- 45 Deg.
		1 month: -20-55 Deg.

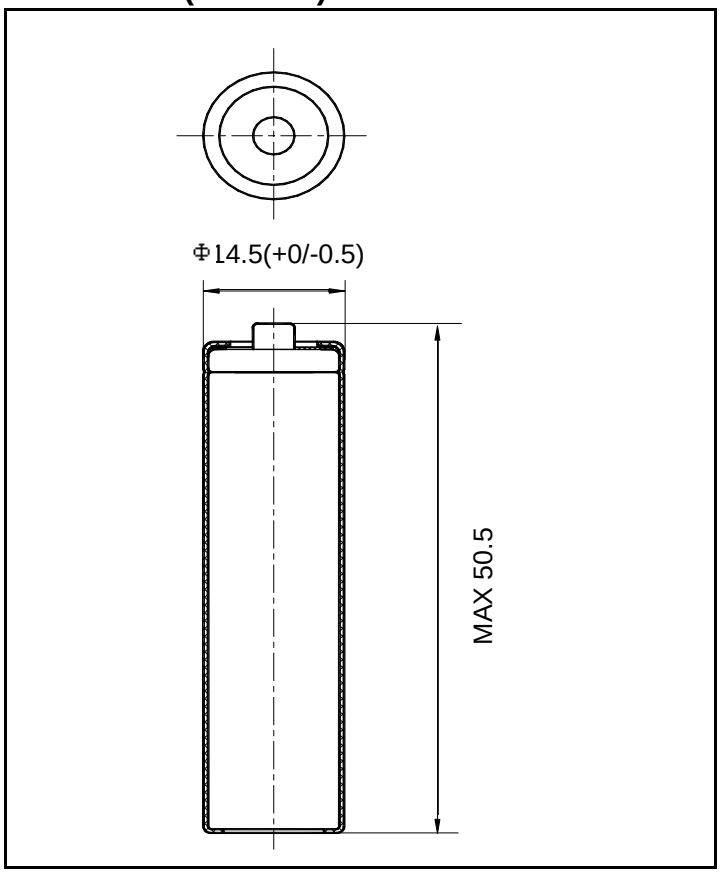
·Charge characteristics



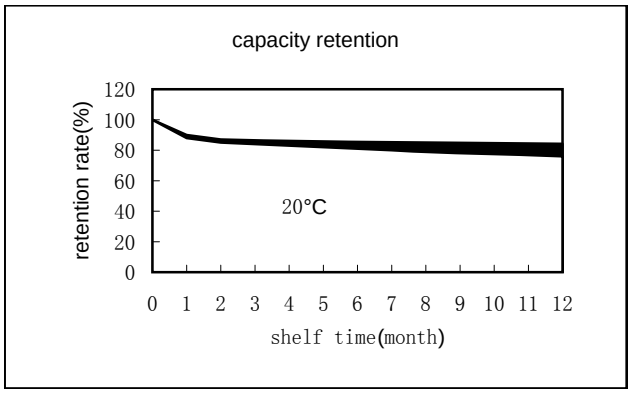
·Discharge characteristics



·Dimension(with tub)mm



·Capacity retention characteristics



·Capacity retention characteristics