EVERGREEN (C.P.) USA INC.
TEL: (650) 952-8091 FAX: (650) 952-3629 E-MAIL: sales@evergreencpusa.com

SPECIFICATIONS
Sealed Rechargeable Nickel Metal Hydride
Ni-MH 200mAh 9V (8.4V)

2. Introduction

NHB9V200 (HR7F22) – 200 Ni-MH (9V) Battery includes 7 cylindrical cells with capacity of 200mAh assembled with plastic and metal components by ultrasonic welding. The tag of the battery is a universal nickel-plated copper connection fastener. The battery can be designed with a variety of package for different customers' needs, and if required the corresponding high-quality charger can be provided.

The battery is designed as power supply with voltage of 8.4-9V, charge and discharge current of no more than 40mA and 100mA respectively for the electric appliances including meter and instrument, lamp, remote controller, toy, microphone, etc. The battery complies with the standard ROHS, and can be delivered with the "SGS" inspection report attached if required.

3. Referenced document

61951-2 @ IEC: 2003 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – P.2: Nickel-metal hydride/By International Electro-technical Commission (IEC).

4. Use of product

4.1 This product cannot be charged for a long time or at a current of more than 0.2C (40mA), and it is not allowed to connect + and – terminals with wire or other metal, or connect other cell in series.

4.2 The battery shall be charged in an optimized manner such as: :

For charging, the charge time shall be 14h if the voltage of 10.3-11.50V and current of 20mA are applied to the battery; The charge time shall be 6h if the current of 40mA is applied.

For discharging, the current shall be no more than 100mA and the final voltage shall be 7.0V.

The cell shall be recharged prior to use.

4.3 For the detailed usage, please contact our Engineering Dept.

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5 Electrical properties

5.1 Electrical properties

Item	Specification	Remarks
Nominal voltage V	8.4	
Nominal capacity mAh	200	In accordance with 5.3.3
Standard charge current mA	20	Charge time is 16h
Charge current mA	10～40	available range
Discharge current mA	≤100	available range
Final voltage V	7.0	
Internal resistance mΩ	≤1500	Measured after fully charged and additional storage time of 24h. (at 1000Hz 25±5℃)
Ambient temperature Charge: Discharge:	0~45℃ -10~45℃	The property of product will be impacted significantly if this range is exceeded.

5.2 Charge and Discharge

Fig.1： Charge (20±5°C)

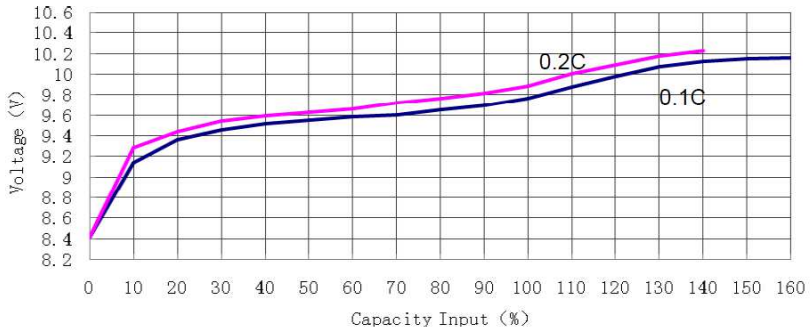
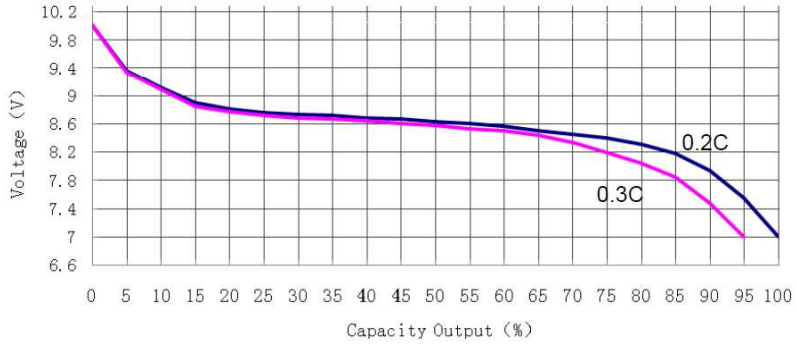


Fig.2：Discharge (20±5°C)



5.3 Capacity test

5.3.1 Capacity（mAh）=Discharge current （mA）×Discharge time(h)；

The charge and discharge current is expressed as a multiple of nominal capacity "C" of the cell. For example, "0.2C" means the current is 0.2 times nominal capacity "C".

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5.3.2 Nominal capacity

Nominal capacity：200mAh

The allowable error in capacity measurement is 4% due to accuracy of test equipment, ambient error and other human factors.

5.3.3 Nominal capacity test：

The capacity and internal resistance shall be tested at 20±5℃ within 1 month before ex-factory.

First, discharge the cell at 0.2C (40mA) down to 7.0V and rest for 1-4h;

Secondly, the battery shall be charged at 0.1C (20mA) for 16h, and then rest for 1-4h.

Finally, the battery shall be discharged again at 0.2C (40mA) down to 7.0V, and if the discharge duration is no less than 5h, then the battery shall be accepted.

Five cycles are permitted for this test. The test shall be terminated at the end of the first cycle which meets the requirement.

5.3.4 Actual capacity

The capacity at different discharging rate is shown in the following table.

In an ambient temperature of 20±5℃, the battery shall be discharged at 0.2C(40mA) down to 7.0V, and rest for 1-4h; After that, the battery shall be charged for 16h at 0.1C (20mA) and rest for 1-4h, then the battery shall be discharged at 0.2C, 0.3C and 0.5C respectively down to 7.0V.

Discharge rate	Current（mA）	Final voltage (V)	Capacity (mAh)
0.2C	40	7.0	⩾200
0.3C	60	7.0	⩾180
0.5C	100	7.0	⩾160

5.4 Charge retention

Discharge the battery at 0.2C (40mA) down to 7.0V, and rest for 1-4h, and then Charge the battery for 16h at 0.1C(20mA), and after 28 days storage at 20±5℃, the capacity at a discharge rate of 0.2C shall be no less than 60% of nominal capacity (i.e. Charge retention capability ≥ 60%).

5.5 Overcharge

The battery shall be discharged at 20±5℃, at a constant current of 0.2C(40mA) down to a final voltage of 7.0V, and then be stored for not less than 1h and not more than 4h. After this storage, the battery shall be charged in an ambient temperature of 20±5℃, at 0.1C (20mA) for 48h, and then there shall be no leakage of electrolyte or deformation of the battery.

After another storage time of 1-4h, the capacity at a discharge rate of 0.2C (40mA) shall reach the nominal value.

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5.6 Cycle life

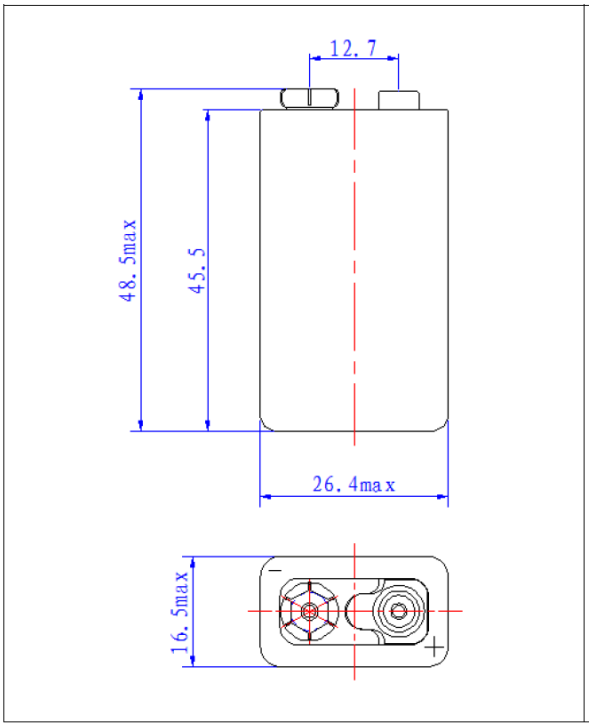
Prior to cycle life test, discharge the battery at 0.2C down to 7.0V. In an ambient temperature of 20±5℃, the available capacity of battery shall be 60% rated capacity after 500 cycles according to the conditions described in the table below. During test, the enclosure of battery shall be protected from the battery's temperature more than 35℃.

Cycle number	Charge	Rest	Discharge
1	0.1C×16h	NO	0.25C×2h20min
2~48	0.25C×3h10min	NO	0.25C×2h20min
49	0.25C×3h10min	NO	0.25C to 7.0V
50	0.1C×16h	1h - 4h	0.20 C to 7.0V

It is permissible to allow sufficient rest time after completion of discharge at cycle 50, so as to start cycle 51. A similar procedure may be adopted at cycle 100,150,200,250,300,350,400 and 450.

Cycle 1 to 50 shall be repeated until the discharge time on any 50th cycle becomes less than 3h. Repeat the cycle, and if the discharge time is less than 3h again, the cycle life of battery shall be considered to be ended.

5.7 Dimensions



Width (Max): 26.4mm

Thickness (Max) 16.5mm

Height (Max): 48.5mm

Weight: approx. 40g

Color: White or black

Outer surface： insulating sleeve available

5.8 Storage

The battery shall be stored in a cool and dry place where the temperature and relative humidity are -0~25℃ and 65±20% respectively. After the battery has been stored for 6 months or the voltage dropped below 7.0V/ battery, the charge and discharge cycle shall be carried out to ensure that the battery can be used at an optimized state for the first time. For the details, please contact out Engineering Dept.

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6. Cautions

6.1 The battery shall be used within half a year after delivery, during which any issue on quality of battery may be set forth by customer.

6.2 The battery shall be charged and discharged as specified in 4.1 and 4.2, and the improper charging and discharging procedures are prohibited from the impact on quality of battery.

6.3 The overcharge and over-discharge shall be avoided considering the serious overcharge and over-discharge may cause damage to the battery.

6.4 Do not connect + and – terminals with wire or other metal, or connect other cell in series.

6.5 Do not mix different types（chemistries）of batteries or charge or discharge reversely.

6.6 Do not dispose in fire or soak in water.

6.7 Do not modify and remodel for installation.

6.8 The battery shall be kept dry and away from any corrosive gas to avoid short-circuit during transportation, storage and operation.

6.9 This technical specification is subject to change without notice.