



# MR9000D1

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## TECHNICAL SPECIFICATION FOR SEALED Ni-MH CYLINDRICAL BATTERY

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### 1. Scope

This specification applies to sealed nickel metal-hydride cylindrical rechargeable single cell, MR9000D1 and stack up battery packs. All the data involving voltage and weight of stack up battery packs equal to the value of single cell times the number of single cell in the battery packs.

### 2. Cell Type

Golden Power Designation: MR9000D1  
 Size: D  
 IEC Designation: HR 20


### 3. Rating

Nominal Voltage: 1.2V  
 Nominal Capacity: 9000mAh  
 Internal Impedance: Max.  $\leq 5$  m $\Omega$  (after fully charged)  
**Normal** Charge Current: 900 mA (0.1C) at 0°C ~ 45°C  
**Normal** Charge Duration: 14~16 hrs  
**Quick** Charge Current: 2700 mA (0.3C) at 10°C ~ 45°C  
**Quick** Charge Duration: 4.5 hrs  
**Trickle** Charge Current: ~ NA ~  
 Discharge Temperature: -20°C ~ 45°C

### 4. Physical Specification

The dimension of a rechargeable nickel metal-hydride cylindrical cell, MR9000D1 are shown in Table I. The PVC jacket comes within these tolerances.

Table I. Dimensions of MR9000D1

Cell Drawing	Cell Dimensions (mm)	
 <p>The drawing shows a cylindrical cell with a diameter dimension of <math>\varnothing 33 \pm 0.0/-1.0</math> mm and a height dimension of <math>61.5 \pm 0.0/-2.0</math> mm.</p>	Diameter	$\varnothing 33 \pm 0.0/-1.0$
	Height	$61.5 \pm 0.0/-2.0$
	Jacket	PVC
	Weight (For Ref. Only)	165 g

**5. Electrical Specifications**

**5.1 Charging procedure for test purpose**

The cell shall be charged at an ambient temperature of  $20\pm 5^{\circ}\text{C}$  at a constant current of 900mA (0.1C) for 15 hours.

**5.2 Discharging test**

The cell shall be charged according to 5.1 prior to the test, and shall be stored for not more than 1 hour at an ambient temperature of  $20\pm 5^{\circ}\text{C}$  and relative humidity of  $65\pm 20\%$ .

At the same ambient temperature, the cell shall be discharged at various rate, and the available rated capacity shall meet the standard specified in Table II. within five cycles.

Table II. Discharge Test at  $20^{\circ}\text{C}$

Constant Discharge Current	Constant Discharge Current Rate (C)	End Point Voltage (V)	Discharge Duration <sup>1)</sup>	Available Capacity (%) <sup>1)</sup>
1800mA	0.2	1.0	5 hr	100
4500mA	0.5	1.0	108 min	90

<sup>1)</sup> Minimum Values

**5.3 Charge retention**

In the charge retention test, the cell shall be charged according to 5.1 , and shall be stored in open circuit for 28 days at an average ambient temperature of  $20\pm 5^{\circ}\text{C}$  and relative humidity of  $65\pm 20\%$ . After the storage, the cell shall be discharged at the same ambient temperature according to the *standard discharge* stated in 5.2 . The capacity of the cell shall not be less than 5850mAh (65%).

**6. Storage Recommendation**

The battery can be stored at a temperature range of  $-20^{\circ}\text{C} \sim 45^{\circ}\text{C}$  for normal storage and  $-20^{\circ}\text{C} \sim 35^{\circ}\text{C}$  for prolonged storage, and at a maximum relative humidity of 85%.

One recovery charging (ref to 5.1) is recommended for every 6 months of storage, in order to protect the cell quality performance.

**7. Cycle Life**

Cycle life test is a series of charge-discharge test cycles, and the cycle life is defined as the number of cycle tested until the available capacity drops down to 60% of nominal capacity.

The cycle life of the cell shall not be less than 500.

**8. Precautions**

- Do not throw the cells / batteries into fire or attempt to disassemble them.
- Do not have direct spot welding to the cells / batteries.
- Do not short circuit the cells / batteries.
- Do not use same size primary batteries together with Ni-MH battery.
- Do not use discharged and charged Ni-MH batteries together.
- Keep charging temperature and rate within our recommended limits.

- 9.** Golden Power reserves the right to modify product specification and data stated herein without prior notice.