

# Specification

**High temperature NiCd Rechargeable D Cell:  
1.2V 4500 mAh**



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**Prepared & Approved by Louis (05/11/07)**

## 1. SCOPE

This specification is suitable for the following sealed Nickel Cadmium cylindrical rechargeable single cell and batteries produced by the AA Portable Power Corp.

## 2. Model

Part#: HCD-D4500B

IEC Size: KR33/62

## 3. RATINGS

3.1 Nominal voltage: 1.2V

3.2 Nominal capacity: 4500mAh

3.3 Typical weight: 132g

3.4 Standard charge: 450mA×15hours

3.5 Standard discharge: 900mA to 1.0V

4.8 Tickle charge: 135~281mA

3.7 Discharge cut-off voltage: 1.0V

3.8 Temperature range for operation: (Humidity: Max.85%)

Standard charge: 0~+70°C

Trickle charge: 0~+70°C

Discharge: -20~+70°C

3.9 Temperature range for storage: (Humidity: Max. 85%)

Within 1 years: -20~+25°C

Within 6 months: -20~+30°C

Within a months: -20~+40°C

Within a week: -20~+50°C

## 4. APPEARANCE

There shall be no such defect as discoloration or electrolyte leakage or zero voltage

## 5. PERFORMANCE

### 5.1 TEST CONDITIONS

The test is carried out with new batteries.(within a month after delivery, the batteries should be discharged to 1.0V at 0.2C before any testing)

Ambient conditions:

Temperature:  $+20 \pm 5^{\circ}\text{C}$

Humidity:  $65 \pm 20\%$

## 5.2 TEST METHOD & PERFORMANCE

Test item	Unit	Spec	Conditions	Remarks
Capacity	mAh	$\geq 4500$	Standard charge/discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	Volt	$\geq 1.25$	Rest for 1 hour after standard charge	1.25V/cell
Internal impedance(R)	m $\Omega$	$\leq 15$	After fully charge (at 1000Hz)	Per Pack
High rate discharge	minute	$\geq 110$	Standard charge and discharge at 0.5CmA	End voltage is 1.0V/pks
Overcharge	mA	450(0.1C)	Continuous charge 28days at 0.1C and stored for 30minutes, discharge to 1.0V at 0.2C	No leakage nor deformation/discharge time $\geq 300$ min
Charge retention	mAh	$\geq 2925$ (65%)	Standard charge; Storage: 28days Standard discharge	End voltage is 1.0V/pks
Safety device operation	N/A	No disrupt nor burst	Forced discharge is conducted for 60minutes at 1C after pre-discharge at 0.2C to 0V	Leakage of electrolyte and deformation are acceptable
Short circuit	N/A	No disrupt nor burst	Fully charged and short circuit for 60minutes	Leakage and deformation are acceptable

## 5.3 Permanent charge endurance

Prior to this test, the cell shall be discharged at 0.2C at  $20 \pm 5^\circ\text{C}$  to a final voltage

of 1.0V and stored, in an ambient temperature of  $40\pm 2^{\circ}\text{C}$ , for not less than 16h and not more than 24h.

IEC61951-1/7.4.2.3

Cycle Number	Ambient Temperature	Charge	Discharge A or B <sup>a</sup>	Minimum discharge Duration
1	$40\pm 2^{\circ}\text{C}$	0.05C for 48h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	No requirement
2		0.05C for 24h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	No requirement 3h 45min
3		0.05C for 24h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	42min 3h 45min 42min
4	$70\pm 2^{\circ}\text{C}$	0.05C for 60days	A: 0.2C to 1.0V or B: 1.0C to 1.0V	No requirement
5		0.05C for 60days	A: 0.2C to 1.0V or B: 1.0C to 1.0V	
6		0.05C for 60days	A: 0.2C to 1.0V or B: 1.0C to 1.0V	
7	$40\pm 2^{\circ}\text{C}$	0.05C for 48h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	No requirement
8		0.05C for 24h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	No requirement 2h 30min
9		0.05C for 24h	A: 0.2C to 1.0V or B: 1.0C to 1.0V	24min 2h 30min 24min
<sup>a</sup> A: for LT, MT or HT cells B: for MT or HT cells only.				

5.4 Charge acceptance at

Prior to this test, the cell shall be discharged at 0.2C at  $20\pm 5^{\circ}\text{C}$  to a final voltage of 1.0V and stored, in an ambient temperature of  $55\pm 2^{\circ}\text{C}$ , for not less than 16h and not more than 24h.

Cycle Number	Ambient Temperature	Charge	Discharge <sup>a</sup>	Minimum discharge Duration
1	55±2°C	1/16C for 48h	0.25C to 1.0V	No requirement
2		1/16C for 24h	0.25C to 1.0V	180 min
3		1/16C for 24h	0.25C to 1.0V	180 min
4	70±2°C	Continuous charge 1/16C for 28 days		
5	70±2°C	discharge to 1.0V at 0.25C, no minimum duration required		
6	55±2°C	1/16C for 48h	0.25C to 1.0V	No requirement
7		1/16C for 24h	0.25C to 1.0V	180 min
8		1/16C for 24h	0.25C to 1.0V	180 min
Note: Battery should be no deformation, leakage and short circuit during all testing period				

### 5.5 Vibration

Cells shall be mechanically and electrically normal after vibration which has an amplitude of 4mm (0.1575inches) a frequency of 1000 cycles per minute (16.7Hz), which should be continued in three directions (X, Y, Z) for 60 minutes.

### 5.6 Incorrect polarity charging

Cells shall not explode after 1 hours of incorrect polarity charging at 0.5CmA.

## 6. PRECAUTION

6.1 We recommend you to set the cut-off voltage at 1.0V/cell.

6.2 Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive over charge/over discharged.

- 6.3 Do not detect  $-\Delta V$  for first 5 minutes of charging.
- 6.4 The cells shall be delivered in charged condition, before testing or using, the cells shall be correctly charged or discharge in accordance with this specification.
- 6.5 Avoid direct soldering onto cells.
- 6.6 Observe correct polarity when connecting.
- 6.7 Do not charge with more than our specified current.
- 6.8 Use only within the specified working temperature range.
- 6.9 Never put a battery into water or seawater
- 6.10 Avoid throwing cells into a fire or attempting to disassemble them. As the electrolyte inside is strong alkaline and can damage skin and clothes.
- 6.11 Avoid short-circuiting. It may be leakage.
- 6.12 Keep away from children, if swallowed, contact a physician at once.
- 6.13 Do not mix Batteryspace.com batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.

## 7. DATA SHEET

