

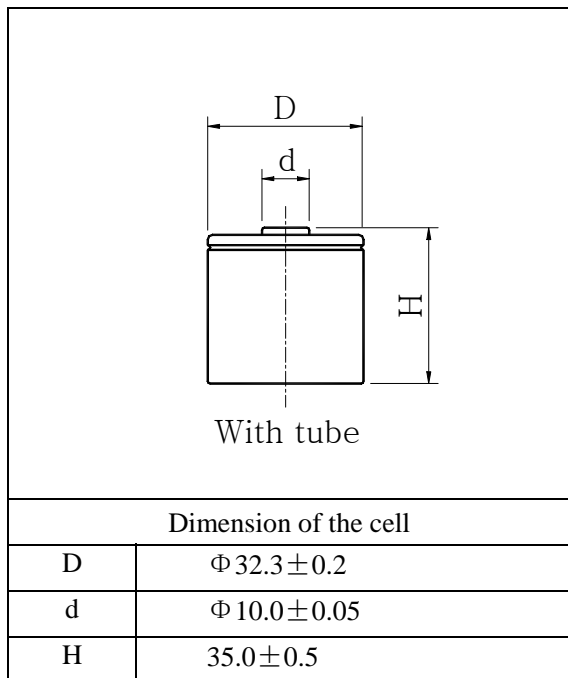
AA Portable Power Corp. (<http://www.batteryspace.com>)

MODEL No: MH-1/2 D3500

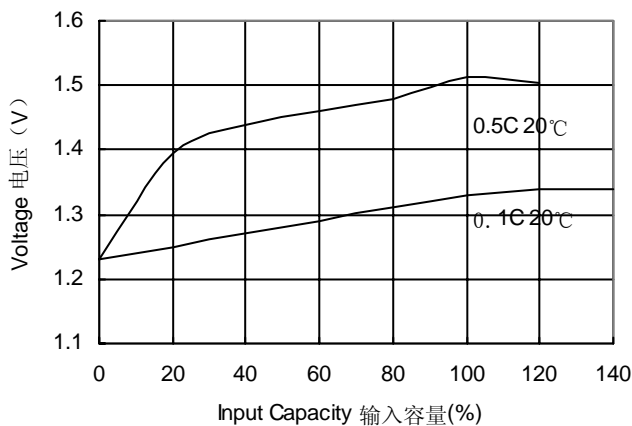
Description: 3500mAh D SIZE Ni-MH

Specification

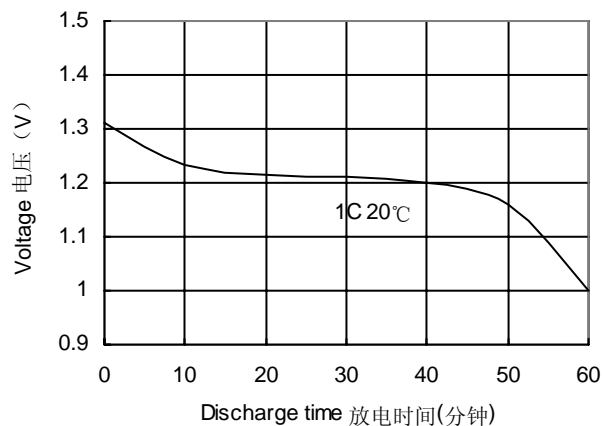
Nominal Capacity		3500 mAh	
Nominal Voltage		1.2 V	
Charge current	Standard	350mA	
	Quick	1050 mA	
	Fast	1750mAh	
Charge time	Standard	14 Hrs	
	Quick	4.0Hrs	
	Fast	2.4Hrs	
Ambient Temperature	Charge	Standard	0°C~45°C
		Quick	10°C~45°C
		Fast	10°C~45°C
	Discharge		-30°C~60°C
Storage		-30°C~65°C	
Internal Impedance(AC) (After Charge)		Max ≤ 14	
Weight		85g	



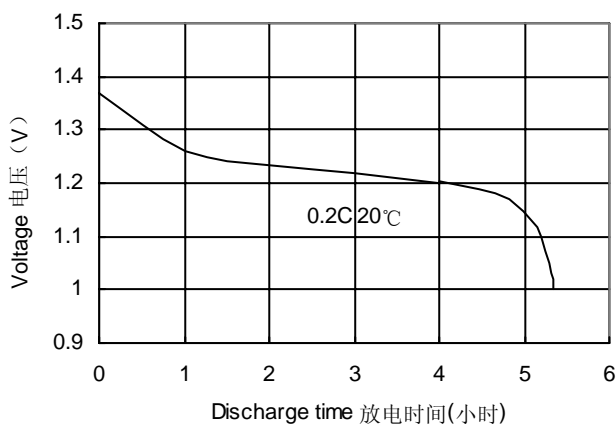
Charge(充电)



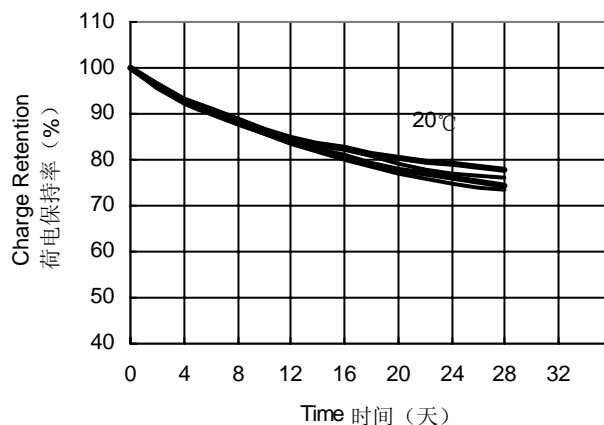
Discharge at high rate(高倍率放电)



Discharge at low rate(低倍率放电)



Charge Retention(荷电保持能力)



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Document Number:

Revision: 3

Document Title: Product Specification of Ni-MH - 1/2 D3500 Cells

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1、SCOPE

This specification governs the performance of the following AA Portable Power Corp Nickel-Metal hydride Cylindrical cell and its stack-up battery.

JJJ Model: MH- 1/2 D3500

Cell Size: D($\phi 32.3^{\pm 0.2} \times 35.0^{\pm 0.5}$)

2、DATA OF STACK UP BATTERIES

All data involves voltage and weight to stack-up battery are equal to the value of unit cell time the number of unit cell which consisted in the stack-up batteries

Example : Stack-up batteries consisting three unit cells

Nominal voltage of unit cell=1.2V

Nominal voltage of stack-up batteries =1.2V \times 3=3.6V

3、RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	Unit cell
Nominal Capacity	mAh	3500	Standard Charge/Discharge
Standard Charge	mA	350(0.1C)	T ₁ =0~45°C (see Note1)
	Hour	14	
Fast Charge	mA	1750 (0.5C)	- $\Delta V=0\sim 5\text{mV}/\text{cell}$ Timer or CutOff=120% nominal capacity or Temp.Cutoff=55°C T ₁ =10~45°C
	Hour	2.4 approx. (see Note 2)	
Trickle Charge	mA	(0.05C)~(0.1C)	T ₁ =0~45°C
Standard discharge	mA	700 (0.2C)	T ₁ = -30~60°C Humidity: Max.85%
Discharge Cut-off Voltage	V/cell	1.0	
Storage Temperature	°C	-30~65	Discharged state、 Humidity、 Max.85%
Typical Weight	Gram	85	unit cell

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4、PERFORMANCE

Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature, T_1 : $20 \pm 5^\circ\text{C}$

Relative Humidity: $65 \pm 20\%$

Notes: Standard Charge/Discharge Conditions:

Charge: $350\text{mA}(0.1\text{C}) \times 14$ hours

Discharge: $700\text{mA}(0.2\text{C})$ to $1.0\text{V}/\text{cell}$

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥ 3500	Standard Charge Discharge	up to 3 cycles are allowed
Open Circuit Voltage(OCV)	V/cell	≥ 1.25	Within 1 hour after standard Charge	
Internal Impedance	$\text{m}\Omega/\text{cell}$	≤ 14	Upon fully charge(1KHz)	
High Rate Discharge(1C)	minute	≥ 54	Standard Charge, 1 hour rest Before discharge by $3500\text{mA}(1\text{C})$ to $1.0\text{V}/\text{cell}$	up to 3 cycles are allowed
Overcharge	/	No leakage nor explosion	$350\text{mA}(0.1\text{C})$ Charge 28 days	
Charge Retention	mAh	$\geq 2450(70\%)$	Standard Charge, Storage: 28 days, Standard Discharge	
IEC Cycle Life	Cycle	≥ 500	IEC285(1993)4.4.1	(see Note 3)
Accelerated Cycle Life	Cycle	≥ 400	Charge: $1050\text{mA}(0.3\text{C})$ Discharge: $1750\text{mA}(0.5\text{C})$ to $1.0\text{V}/\text{cell}$, End-of :80% nominal capacity	Cycling charging cut-off condition: - $\Delta V=0\sim 5\text{mV}/\text{cell}$ and Timer cut-off=110% Nominal capacity Input and Temp.cutoff= 55°C
Leakage		No leakage nor deformation	Fully charged at : $1750\text{mA}(0.5\text{C})$ For 2.4 hrs Stand for 14 days	
Vibration Resistance		Change of voltage should be under $0.02\text{V}/\text{cell}$, Change of impedance should be under 5 milli-ohm/cell	Charge the battery 0.1C 14hrs, then leave for 24hrs, check Battery before/after vibration, Amplitude 1.5mm Vibration 3000 CPM Any direction for 60mins.	
Impact Resistance		Change of voltage should be under $0.02\text{V}/\text{cell}$ Change of impedance should be under 5 milli-ohm/cell	Charge the battery 0.1C 14hrs Then leave for 24hrs, check bat-before/after dropped, Height 50cm Wooden board(thickness 30mm) Direction not specified, 3 times.	

5、 CONFIGURATION, DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

6、 EXTERNAL APPEARANCE

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

7、 WARRANTY

One year limited warranty against workmanship and material defects.

8、 CAUTION

- (1) Reverse charging is not acceptable.
 - (2) Charge before use. The cells/batteries are delivered in an uncharged state.
 - (3) Do not charge/discharge with more than our specified current.
 - (4) Do not short circuit the cell/battery Permanent damage to the cell/battery may result.
 - (5) Do not incinerate or mutilate the cell/battery.
 - (6) Do not solder directly to the cell/battery.
 - (7) the life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.
 - (8) store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.
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Notes:

- (1) T_1 : Ambient Temperature.
- (2) Approximate charge time from discharged state, for reference only.
- (3) IEC285(1993)4.4.1 Cycle Life:

Cycle No.	Charge	Rest	Discharge
1	$0.1C \times 16h$	None	$0.25C \times 2h20min$
2-48	$0.25C \times 3h10min$	None	$0.25C \times 2h20min$
49	$0.25C \times 3h10min$	None	0.25C to 1.0V/cell
50	$0.1C \times 16h$	1-4h	0.2C to 1.0V/cell
Cycles 1 to so shall be repeated until the discharge duration on any 50th Cycle becomes less than 3 h.			
