Ni-MH Rechargeable Battery

SC3500mAh

Specification

1 APPLICATIONS

The specification applies to the following sealed Ni-MH rechargeable battery made by Lipower.

TYPE:MHSC3500mAh APPLICATION : Power tools,Solar lamp Emergency Lightings and security system Etc.

2 WORKING THEORY

The negative of Lipower NI-MH cylindrical battery is metal of MH, the positive is NiOOH, The electrolyte is NiOOH of high purity. The electrochemical process are represented by the following reactions:

$$NiOOH+H_2O+e \rightarrow Ni(OH)_2+OH^-$$
$$MH+OH^- - e \rightarrow M+H_2O$$
$$MH+ NiOOH \rightarrow M+Ni(OH)_2$$

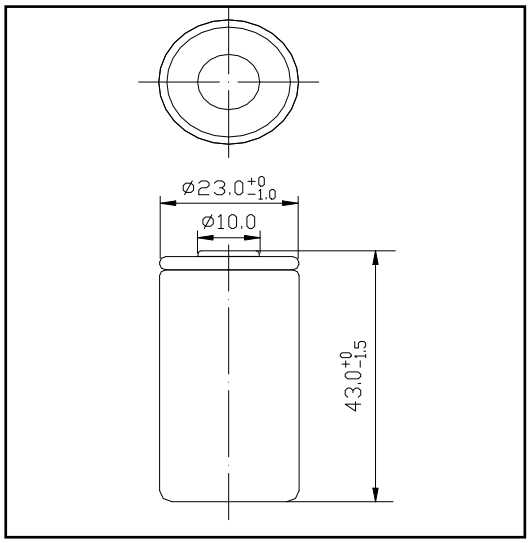
During discharge, NiOOH of negative is oxidized to $Ni(OH)_2$, The free electrons flow into the positive through the external circuit, NiOOH of positive receive the electrons and be deoxidized to $Ni(OH)_2$. Charge process is just the opposition of discharge.

3 EXTERNAL DIMENSION/WEIGHT

3.1 Dimensions: $23.0^{\pm0.5}\times43.0^{\pm0.5}$ (mm)

3.2 Gross weight: 53.0(g)

3.3 Shape size (after packing)



4 ELECTRICAL PERFORMANCE

4.1 Nominal voltage： 1.2 V。

4.2 Test requirements

The following conditions are for new batteries (within one month after delivery)

Environmental Temperature: ＋15～＋25℃; Relative humidity: 45%～85%.

4.3Available capacity

Available capacity is not a stable value; it changes depending on discharge rate, temperature

and end voltage. Lipower batteryNi-MH SC3500mAh is charged at 0.1C_5A for 16hrs under test conditions, and discharge up to an end of discharge voltage of 1.0V/cell at 0.2C_5A, then the available capacity of the battery is 100%-105% of the rated capacity.

4.4 Charging conditions

Before it is charged, the battery should be discharged at 0.2C_5A to an end of voltage of 1.0V/cell under test conditions.

The following conditions are charge conditions:

4.4.1 Standard charge： 0.1C_5A charge current for 16h

4.4.2 Normal charge： 0.2C_5A charge current for 7. 5h

4.4.3 Trickle charge： 0.03C_5A～0.05C_5A permanent charge

4.5 Charging control

When battery is charged, cutting off the charging current depending on one of the following factors:

-ΔV: 15mV/cell

Duration: Input 120%-130% of rated capacity

4.6 Operate temperature range :(Max relative humidity:85%)

Standard charge : －10～＋40℃

Quick charge : 0～＋40℃

Trickle charge : 0～＋40℃

Discharge : -18～＋55℃

4.7 Storage temperature range (Max relative humidity:85%)

Within one yearss: －18～＋25℃

Within six month: －18～＋30℃

Within a month: －18～＋40℃

Within a week: －18～＋50℃

4.8 Discharge performance

The capacity of the battery shall be not less than 90% of nominal capacity after charged at 0.1C_5A for 16h at 20±5℃, rest for16h to 24h at 0℃±2℃,then discharged at 0.2C_5A to 1.0V/cell at 0℃±2℃.

4.9 Test Conditions

The following test conditions are applicable for new batteries (within one month after shipment). Batteries should be discharged from 0.2C5A constant current to 1.0V/battery before charging under test conditions.

Test conditions:

Temperature: +20+5

Humidity: 45%-85%

Note: Standard charging method: 300 mA (0.1C5A) charging for 13 hours

Normal charging method: 600 mA (0.2C5A) charging for 6.0 hours

Standard discharge method: 600 mA (0.2C5A) to 1.0V/cell

4.91Test method & performance

Test	Unit	Specification	Conditions	remarks
Capacity	mAh	3500	Standard charge/standard discharge	Three cycles are allowed
Shipment Voltage	V/cell	≥1.25		AQL Ⅱ =0.65%
Open Circuit Voltage (OCV)	V/cell	≥1.30	After 1 hour standard charge	
Internal impedance	mΩ/cell	≤10	Charge at 0.2C_5A for 8hrs, Rest for 1h, and measure the impedance with LCR instrument (AC 1KHz)	
Discharge (1C_5A)	minute	≥54	Charge at 0.1C_5A for 16hrs,And rest for 1h, then discharge at 1.0C_5A	End Voltage is1.0V/cell
High rate discharge(5 C_5A)	minute	≥9	Charge at 0.1C_5A for 16hrs,And rest for 1h, then discharge at 5C_5A	End Voltage is0.8V/cel
Over charge	hour	No leakage and no deformation	0.1C_5A charge for 48 hours,Rest for 1-4h, then discharge at 0.2C_5A to 1.0V	End Voltage is0.8V/cell
Over discharge		No leakage and no deformation	Discharged for 24hrs ,with an load resistor	Load(Ω)=1.2V ×n/2C_5A
Reverse charge		No burst	Reverse charge at 1.0C_5A for 1hrs	Prior to test, cell shall be fully discharged
Safety valve performance		No disrupt, no burst, but leakage and deformation are allowed.	Charge at 1.0C_5A for 1.5hrs and discharge at 0.2C_5A to 0V, then discharge at 1.0C_5A for 60min	

Charge retention	mAh	≥1950 （60%CN）	Standard charge; Storage of 28 days; Standard discharge	Ambient Temperature: 20±2℃
Cycle life	Cycle	≥500	IEC61951-2	Refer .to Note
Leakage		No leakage or deformation	1000 charge at 40mA(0.1C_5A), then storage of 14 days	Ambient Temperature: 20±5℃

Note: Cycle life { IEC61951-2}:

Cycle number	Charge	Stand in charged condition	Discharge
1	0.10I_tA for 16h	none	0.25I_tA for2h 20min [a]
2-48	0.25I_tA for 3h 10 min	none	0.25I_tA for2h 20min [a]
49	0.25I_tA for 3h 10 min	none	0.25I_tA to1.0V
50	0.10I_tA for 16h	1h to 4h	0.20I_tA to1.0V [b]

a) If the cell voltage drops below 1.0V,discharge may be discontinued.
b) It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50,so as to start cycle 51 at a convenient time .A similar procedure may be adopted at cycles 100,150,200,300and 350times.

Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3h. At this stage, a repeat capacity measurement as specified for cycle 50 shall be carried out.

The endurance test is considered complete when two such successive capacity cycles give a discharge duration of less than 3h,The total number of cycles obtained when the test is completed shall be not less than 50.

4.10 Storage

After a open-circuit storage of 12 months, the battery can be charged and discharged at 0.2C_5A～0.5C_5A immediately. It shall not cause damage to its performances.

4.11 Vibration

The battery shall not cause damage to its performances when tested with the amplitude at 4 mm (0.158 inch) and the frequency at 1000Hz.

4.12 Drop test

The battery shall not cause damage to its performances when dropped to the wooden board at a height of 450mm(17.716 inch).

5 SUGGESTION & ADVICE

5.1 Do not reverse charge batteries.
5.2 Do not incinerate or mutilate batteries, may burst or release toxic material.
5.3 Do not solder directly to cells or batteries.
5.4 Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
5.5 If find any noise, excessive temperature or leakage from a battery, please stop its use.
5.6 When find battery power down during use, please switch off the device to avoid

over-discharge.

5.7 When not using a battery, disconnect it from the device.

5.8 Never put a battery into water or seawater.

5.9 Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin. And it may damage clothing upon contact.

5.10 Keep away from children. If swallowed, contact a physician at once.

5.11 The end-voltage are recommended at 1.0±0.1V/cell so as not to cause memory effect.

5.12 The battery may go fail when shorted if over-charged or charged with an incorrect way.

5.13 Store batteries in a cool dry place.

5.14 Use the correct charger for Ni-MH batteries.

5.15 **If necessary, please contact Lipower for detailed information.**