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Specification

Product Specification

Name：	Ni-Cd Rechargeable Battery
Model:	D4500mAh
Author:	
Review:	
Approval:	
Date:	2020/03/08

1.APPLICATIONS

The specification applies to the following sealed Ni-CD rechargeable battery.

Model ： D4500Ah

2WORKING THEORY

At the positive electrode: $2NiOOH+2H_2O+2e \rightleftharpoons 2Ni(OH)_2+2OH^-$

At the negative electrode: $Cd+2OH^--2e \rightleftharpoons Cd(OH)_2$

Overall reaction： $Cd+2NiOOH+2H_2O \rightleftharpoons 2Ni(OH)_2+Cd(OH)_2$

3. Battery Model

3.1 Type ： Sealed Ni-CD Rechargeable battery

3.2 Number ： D4500

3.3 Specification：D4500

4. ELECTRICAL PERFORMANCE

4.1 Nominal voltage：	1.2V
4.2 Nominal Capacity:	4500mAh/0.2C_5A
4.3 Weight :	Approx119g (unit cell)
4.4 Stand Discharge ：	450mA (0.1C_5A) × 15hours
4.5 Normal charge：	900mA (0.2C_5A) × 7hours
4.6 Quick charge：	1800mA (0.4C_5A) × 180min ($-\Delta$ V=15mV、)
4.7 Trickle charge :	135～225mA (0.03C_5A～0.05C_5A)

4. 8 Operate temperature range :(Max relative humidity:85%)

Stand Discharge：	0～＋ 45℃
Quick charge：	0～＋ 45℃
Trickle charge：	0～＋ 45℃
Discharge：	-18～＋55℃

4. 9 Storage temperature range (Max relative humidity:85%)

Within one week ：	-18～＋45℃
Within a month：	-18～＋45℃
Within six months：	-18～＋45℃

Within two years：　　-18～＋30℃

5. Configuration and dimensions

Model: D4500

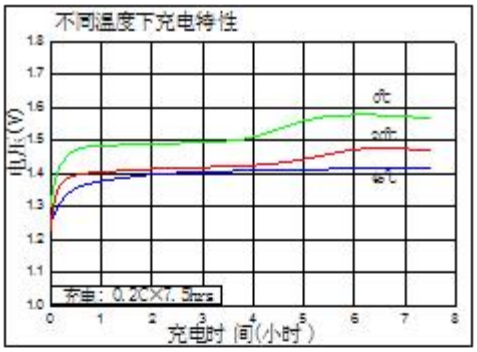
Performance (monomer battery)

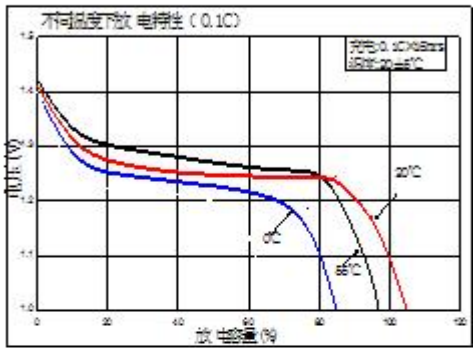
Nominal voltage			1.2V	
Capacity (mAh)			0.2C[1]	
	Minimum		4500	
diameter			33.0+0 -1.0 mm	
height			62+0 -2.0 mm	
weight			About 119g	
resistance (1000Hz.)			≤9mΩ(充电后 After charging)	
charge	standard		0.21C5A	
	fast		0.4C5A	
	trickle	MAX	0.05C5A	
		MIN	0.03C5A	
Ambient temperature	charge	standard	0℃~45℃	32~131°F
		fast	0℃~45℃	32~131°F
	discharge		-18℃~45℃	-0.4~131°F
	storage	Six months	-18℃~45℃	-0.4~113°F
		Two years	-18℃~30℃	-0.4~86°F

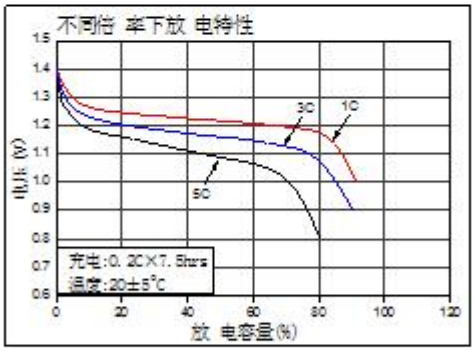
External Appearance

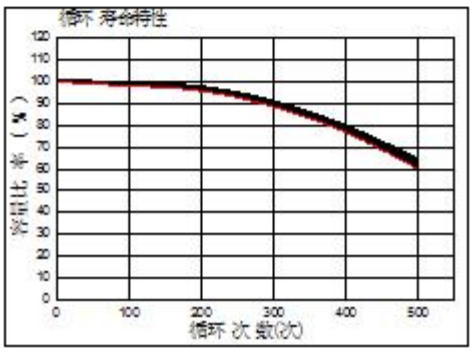
dimension (after packing)

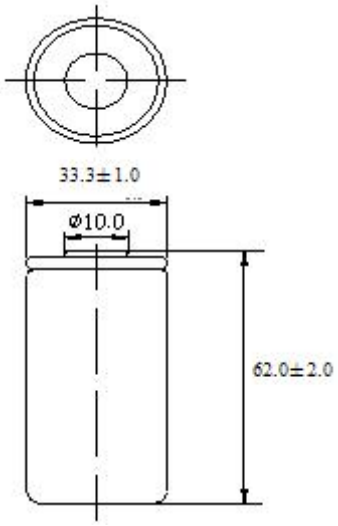
Graphs











NOTES：

[1] 20 ℃ ambient temperature ,0.1C charging 15 hourS, rest 1 hour , discharge by 0.2c to 1.0V/cell

[2] weight for reference

[4] 0.2C charging 7 hourS

[5] 0.4C charging 180 minutes、-ΔV=15mV、TOC＝45℃

[6] discharge by 0.2c to 1.0V/cell

6. Performance

6.1Test Condition

Unless otherwise stated , tests should be done within one month of delivery under the following conditions :before charging,the battery need discharge by0.2C_5A to 1.0v/CELL under test condition ;

Test Condition ：

Temperature ： ＋20±5℃

Humidity ： 45%～85%

Note: standard charging methods：450 mA（0.1C_5A）(charge)15(hours)

Normal charging methods：900 mA（0.2C_5A）(charge)7(hours)

Standard discharge methods：900mA（0.2C_5A）discharge 1.0v/CELL

6.2 Test Condition

Test	Unit	**Specification**	Condition	Remarks
Capacity	mAh	4500	stand charge and discharge	3 cycles are allowed
Shipment Voltage	V/cell	≥1.25		AQL Ⅱ=0.65%
Open Circuit Voltage	V/cell	≥1.33	Within 1 hour after standard charge	
Internal impedance	mΩ/cell	≤ 9	0.1C_5A Charge 15hours ,rest one hour , measure the impedance with LCR instrument (AC 1KHz)	
over charge	hour	≥ 5 No leakage nor deformation	0.1C_5Acharge for 48hours , rest 1 -4 hours , discharge to 1.0V/CELL by 0.2C_5A	End Voltage is 0.8V/cell
Charge Retention	mAh	≥(65%CN)	Storage 28 days after stand charge , standard discharge	20±2℃Ambient Temperature: 20±2℃
Cycle life	cycle	≥500	IEC61951-2(7.4.1.1.1)	Refer .to Note
Leakage test		No leakage or deformation	Fully charged at 450mA(0.1C5A), then storagefor 14 days	20±5℃Ambient Temperature: 20±5℃

Note: Cycle life { IEC61951-1(7.4.1. 1.1)}:

Before test , it need discharge to 1.0V/cell by 0.2I_tA, then test at 20±5℃Ambient Temperature

cycle no.	charge	rest	discharge
1 2－48 49 50	0.1I_tAfor 16h 0.25I_tAfor3h10min [a] 0.25I_tAfor 3h10min 0.1I_tAfor16h	none none none 1to 4h	discharge 140 minutes by0.25I_tA : discharge 140 minutes by0.25I_tA: discharge to 1.0V/CELL by 0.25I_tA discharge to 1.0V/CELL by 0.2I_tA
cycle no.	charge	rest	discharge

Cycles 1 to 50 shall be repeated until the discharge duration on any 50 th cycle becomes less than 3 h The total number of cycles obtained when the test is completed shall be not less than 500.

6.3 Storage

After a open-circuit storage of 12 months, the battery can be charged and discharged at 0.2C_5A～0.5C_5A immediately(this cycle allowed in five times). 0.2 C discharge capacity is not less than 80% of the initial capacity.

6.4Vibration

The battery keep a normal performances when tested with the amplitude at 4 mm (0.158 inch) and the frequency at 1000.

6.5Drop test

The battery shall keep a normal performances when dropped to the wooden board at a height of 450mm(17.716 inch).

6.6Safety performance

6.6.1Over discharge

External resistance, make the battery a discharge 24 hours (external resistance (m Ω) = 1.2 V × n × 1000/2 C5A), battery no leakage and deformation.

6.6.2 Safety valve

Test method: 0.2 C5A discharge battery to 0 V, then increase the discharge current to 1.0 C5A, and keep 1 hour. The battery no burst, no explosion, allow the leakage and deformation.

6.6.3 Short circuit

Test methods: 0.1 C5A charging the battery 15 h,Short circuit 1.0 hours. The battery no explosion, allow the leakage and deformation.

7 Others:

the termination voltage of 1.0 V/cell;

if over 1.1 v, it will cann'tt effective use of capacity !

if under 1.0 V, it will lead to a over discharge or reverse charge !

8 SUGGESTION & ADVICE

8.11 Reverse charging is not acceptable .
8.12 Do not incinerate or mutilate batteries,
8.13 Do not solder directly to batteries.
8.14 Do not mix new batteries in use with semi-used batteries
8.15 If find any noise, excessive temperature or leakage from a battery, please stop using.
8.16 Keep away from children.
8.17 Store batteries in a cool dry place.
8.18 Use the suitable charger for batteries.