Revision：4.2

Product Specification

Product Model: Nickel-Cadmium Battery

Product Type: 1DH4-5

Draw up： Technical Department

Date： 27/11/2009

1、 SCOPE

This specification governs the performance of the following Nickel-Cadmium cylindrical cell and its stack-up battery.

Model： 1DH4-5

Cell Size：Dcrew cut(32.1±0.1×59.0±0.5) mm
Dcusp(32.1±0.1×60.5±0.5) mm

2 、DATA OF STACK UP BATTERIES

All data involve voltage and weight of stack-up batteries are equal to the value of unit cell multiplied by 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×3=3.6V

3、 RATINGS

Description	Unit	Specification	Condition
Nominal Voltage	V/cell	1,2	Unit cell or stack-up batteries
Nominal Capacity	mAh	4500	Standard Charge/Discharge
Standard Charge	mA	450 (0.1C)	T_a=20±5℃
	hour	14~16	
Trickle Charge	mA	(0.03C)~(0.05C)	T_a=20±5℃
Standard discharge	mA	900 (0.2C)	T_a= 20±5℃ Humidity：Max85%
Discharge Cut-off Voltage	V/cell	1,0	
Storage Temperature	℃	-20~30(Within 1 year)*	Discharged state Humidity：Max85%
		-20~40(Within 6 months)	
		-20~50(Within 1 month)	
		-20~60(Within 1 week)	
Typical Weight	Gram	127	unit cell

*To keep the best performance for those not used for a long time,we recommend to charge and discharge the cells/batteries at least once in every 6 months.

4、 PERFORMANCE

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

Ambient Temperature ： 20±5℃
Relative Humidity ： 65±20%
Notes： Standard Charge/Discharge conditions：
Charge： 450 mA(0.1C)× 14 hours
Discharge： 900 mA(0.2C) to 1.0V/cell

Test	Unit	Specification	Condition				Remarks
Capacity	mAh	≥ 4500	Standard Charge/Discharge				up to 3 cycles are allowed
Open Circuit Voltage(OCV)	V	≥ 1,25	Within l hour after standard charge				
Internal Impedance	mΩ	≤ 9	Upon fully charged(lKHz)				
High Rate Discharge(1C)	min	≥ 48	Standard Charge, l hour rest before discharge by 1C to 1.0V/cell				up to 3 cycles are allowed
Charge Retention	mAh	≥ 2925	Standard Charge, Storage 28days，Standard Discharge				T_a=20℃±5℃
Permanent Charge Endurance Test	min	T1,T2≥ 225	IEC61951-1(2003)7.4.2.3				See Table 1
	min	T3,T4≥ 150					
Charge acceptance			Cycle	Charge	Rest	Discharge	See Note 1
			1	0.05C×48h	None	0.2C to 1.0V/cell	
	min	≥ 225	2	0.05C×24h	None	0.2C to 1.0V/cell	
	min	≥ 225	3	0.05C×24h	None	0.2C to 1.0V/cell	
IEC Cycle Life	Cycle	≥ 500	IEC61951-1(2003)7.4.1.1				See Table 2
Leakage		No leakage nor deformation	Fully charged at : 225 mA for 28 days at 0±2℃.				
Vibration Resistance	N/A	Change of voltage should be less than 0.02V/cell,change of impedance should be less than 5milliohm/cell	Charge the battery at 0.1C for 14hrs,then leave for 24hrs,check battery before/after vibration,amplitude 1.5mm,vibration 3000 CPM,any direction for 60mins.				
Impact Resistance	N/A	Change of voltage should be less than 0.02V/cell,change of impedance should be less than 5milliohm/cell	Charge the battery at 0.1C for 14hrs,then leave for 24hrs,check battery before/after dropped,height 50 cm 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 or 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 cells/batteries may result.

[5]Do not incinerate or mutilate the cells/batteries.

[6]Do not solder directly to the cells/batteries.

[7]The expected life may be reduced if the cells/batteries are subjected to adverse conditions as: extreme temperature, deep cycling, excessive overcharge/ over-discharge.

[8]Store the cells/batteries in a cool dry place. Always discharge batteries before packing.

Table 1: IEC61951-1(2003)7.4.2.3 Permanent Charge Endurance Test:

Cycle Number	Ambient temperature	Charge	Rest	Discharge	Discharge capacity
1	+40℃±2℃	0.05C×48h	None	0.2C to 1.0V/cell	
2		0.05C×24h	None	0.2C to 1.0V/cell	T1
3		0.05C×24h	None	0.2C to 1.0V/cell	T2
4	+70℃±2℃	0.05C×60d	None	0.2C to 1.0V/cell	
5		0.05C×60d	None	0.2C to 1.0V/cell	
6		0.05C×60d	None	0.2C to 1.0V/cell	
7	+40℃±2℃	0.05C×48h	None	0.2C to 1.0V/cell	
8		0.05C×24h	None	0.2C to 1.0V/cell	T3
9		0.05C×24h	None	0.2C to 1.0V/cell	T4

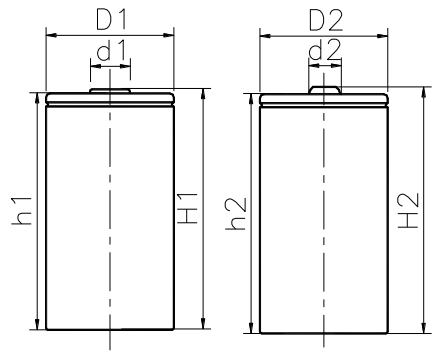
Table 2: IEC61951-1(2003)7.4.1.1 Cycle Life:

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

Notes: (1)Before test,the cell shall be discharged at 0.2C to 1.0V/cell ,and stored 16h～24h at 55℃±2℃.

(2)T_a: Ambient Temperature.

MODEL No: 1DH4-5 **Description:** 4500 mAh SIZE **Ni-Cd** D

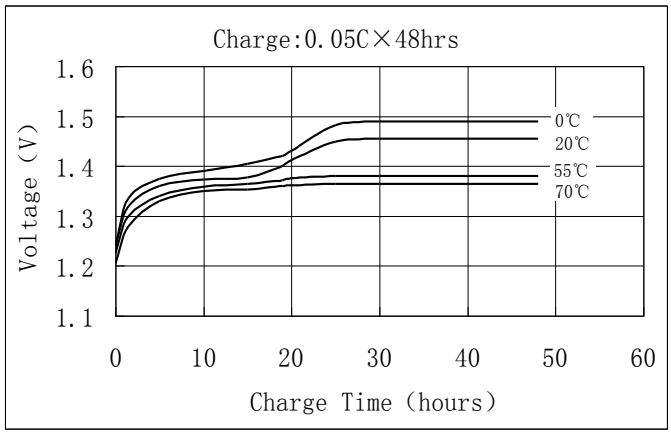


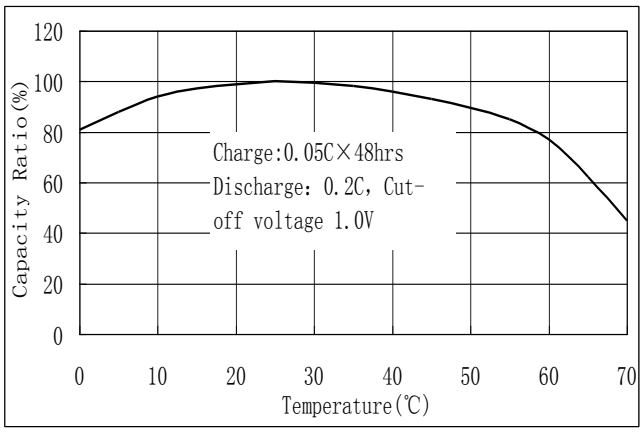
Dimensions(without Tube) (mm)

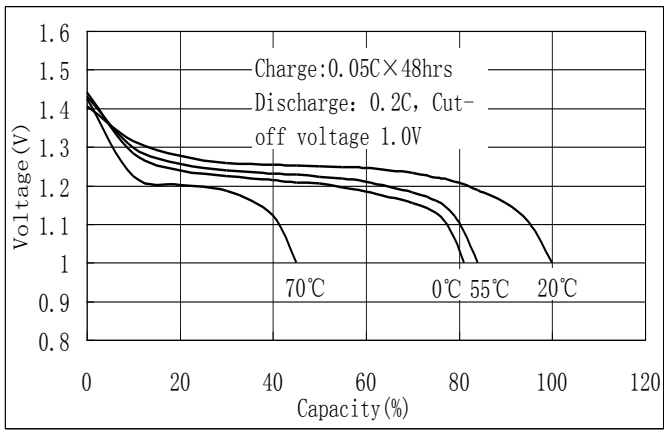
D	32.10±0.10		
d1	10.00±0.08	d2	8.00±0.08
H1	59.00±0.50	H2	60.50±0.50
h1	58.50±0.50	h2	58.50±0.50

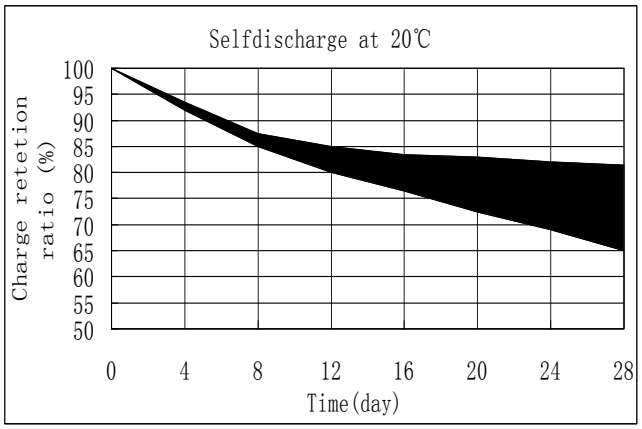
Specification

Nominal Capacity			4500 mAh
Nominal Voltage			1,2 V
Charge current		Trickle	225 mA
		Standard	450 mA
Charge time		Trickle	48 Hrs~
		Standard	14~16 Hrs
Ambient Temperature	Charge	Trickle	0℃~70℃
		Standard	0℃~70℃
	Discharge		-20℃~70℃
	Storage		-20℃~60℃
Internal Impedance(mΩ) (After Charge)			≤ 9
Weight			127 g









We reserve the right to alter or amend the design,model and specification without prior notice.