



**比亚迪股份有限公司**  
**BYD COMPANY LIMITED**

**SEALED NICKEL CADMIUM**  
**RECHARGEABLE CELLS & BATTERIES**  
**APPROVAL SHEET**

**TO :** \_\_\_\_\_

**BYD MODEL NO :** D-4/5SC1400

**CUSTOMER APPROVED P/N :** \_\_\_\_\_

**DATE OF SUBMISSION :** 30-Dec-09

**ATTACHMENT :** SPECIFICATION

**TOTAL NO. OF PAGES :** 5

**SPECIFICATION NO :** S-D4/5SC140001

**VERSION NO :** 1.0

<b>Drawn</b>	<b>ZHANZHENG-LI</b>	
<b>Approved</b>	<b>Customer Dept. I</b>	<i>ZHIJIAN-LI</i>
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*(with company chop)*

*Please sign and return one copy to us*

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**1. APPLICATION**

This specification applies to the Ni -Cd batteries.

Model :           D-4/5SC1400          

**2. CELL AND TYPE**

2.1 Cell : Sealed Ni —Cd Cylindrical Cell.

2.2 Type :           D-4/5SC1400          

2.3 Size type:           4/5SC          

2.4 IEC type:           KR23/34          

**3. RATINGS**

3.1 Nominal voltage :           1.2           V  
 3.2 Nominal capacity :           1400           mAh/0.2CmA(Note 1)  
 3.3 Typical weight :           36           g (unit cell)  
 3.4 Standard charge :           140           mA×15hours  
 3.5 Rapid charge :           1400mA×1.2hours(Max.)            
 (with-ΔV, Time, Temperature control system)

Trickle current :           42~70           mA

3.6 Discharge cut-off voltage           1           V(0.2CmA)

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

Standard charge	0 ~ +45°C
Rapid charge	+10 ~ +40°C
Trickle charge	0 ~ +45°C
Discharge	-20 ~ +65°C

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

Within 2 years (Note 2)	-20 ~ +30°C
Within 6 months	-20 ~ +40°C
Within a months	-20 ~ +50°C
Within a week	-20 ~ +60°C

Note 1: Rated capacity figures are based on single cell performance.

Note 2: We recommend cells or batteries are charged and discharged at least once every 6 months.

**4. ASSEMBLY & DIMENSIONS**

Per attached drawing.

**5. PERFORMANCE****5.1 TEST CONDITIONS**

The test is carried out with new batteries.

( within a month after delivery )

ambient conditions

Temperature : +20±5°C                      Humidity : 65±20%

Standard charge : 140mA(0.1C)×15hrs

Standard discharge : 0.2C to 1.0V

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**5.2 TEST METHOD & PERFORMANCE**

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥1400	Standard charge/discharge	up to 3 cycles are allowed
Open Circuit Voltage(OCV)	Voltage (V)	≥1.25	After 1 hour standard charge	
Internal impedance	mΩ/cell	≤10	Upon fully charge (1KHz)	
High rate discharge(1C)	minute	≥54(1260mAh)	Standard charge before discharge	End Voltage is 1.0V/Cell
Discharge current (C)	A	≤30	Maximum continuous discharge current	
Overcharge		no leakage nor explosion	140 mA(0.1C) charge for 28 days	
Charge Retention	mAh	≥980	standard charge; storage: 28 days Standard discharge	
Cycle Life	cycle	≥500	IEC61951-1	see note 3
Leakage		no leakage nor deformation	Fully charge at 1400 mA(1C), then storage 14 days	

Note 3 IEC61951-1 cycle life

Cycle number	Charge	Rest	Discharge
1	0.1CmA for 16h	none	0.25CmA for 2.33h
2~48	0.25CmA for 3.17h	none	0.25CmA for 2.33h
49	0.25CmA for 3.17h	none	0.25CmA to 1.0V/cell
50	0.1CmA for 16h	1~4h	0.20CmA to 1.0V/cell

50-cycle test as per above table is repeated . The discharge time of the 100th, 200th, 300th, 400th, 500th should be more than 3 hours respectively. (Ambient temperature is 20±5)°C

**5.3 Humidity**

The cells shall not leak during the 14 days when it is submitted to the condition of a temperature of 33±3 °C and a relative humidity of 80±5% (salting is allowed).

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**5.4 Vibration**

Cells shall be mechanically and electrically normal after vibration which has an amplitude of 4mm(0.1575 inches) a frequency of 1000 cycles per minute, which should be continued in any directions during 60 minutes

**5.5 Shock**

Cells shall be mechanically and electrically normal after being subjected to a drop from a height of 450mm (17.716inches) onto an oak board in a voluntary axis respectively 3 times.

**5.6 Short**

Cells shall not explode after 1 hour short-circuit test.

**5.7 Incorrect polarity charging**

Cells shall not explode after 5 hour of incorrect polarity charging at 1 CmA.

**6. PRECAUTION**

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

6.2 If it is below 1.0V/cell, cells may have over-discharged or reverse charged.

6.3 Do not detect  $-\Delta V$  for first 5 minutes of charging.

6.4 The cells shall be delivered in discharged condition, Before testing or using, the cells shall be correctly charged in accordance with this specifications.

**7. WARNING**

7.1 Avoid direct soldering onto cells.

7.2 Observe correct polarity when connecting.

7.3 Do not charge with more than our specified current.

7.4 Use only within the specified working temperature range.

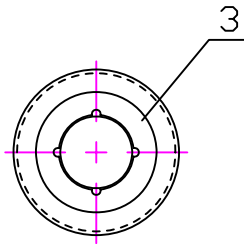
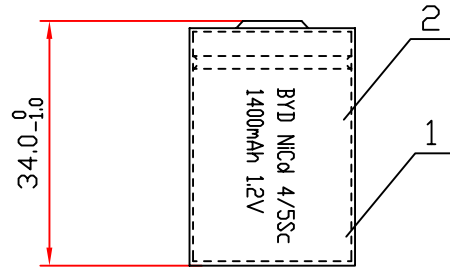
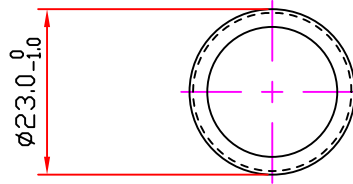
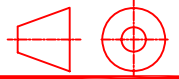
**8. DANGER!**

8.1 Avoid throwing cells into a fire or attempting to disassemble them. As the electrolyte inside is strong alkaline and can damage skin and clothes.

8.2 Avoid short circuiting. It may be leakage.

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NO.	NAME	SIZE	QTY	NOTE	SAP NO
3	WASHER	SC	1	WHITE	413876
2	PVC	36X43	1	116C	400533
1	CELL	4/5SC	1	NI-CD	



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BYD COMPANY LIMITED

DRAWN	ZHANZHENG-LI	DATE	2009/12/29
CHECKD	ZHIJIAN-LI	DATE	2009/12/29
APPROVED	JIANGUO-TANG	DATE	2009/12/29
SCALE	/	UNIT	MM