



株式会社セイキ

奈良県大和高田市勝目 57-1

TEL 0745-53-7027 FAX 0745-53-7028

一般仕様書

弊社型式 ; RD NiCD4/5 1200

製品の名称 ; ニッカド二次電池セル

責任者	担当者

EDITION	AMENDMENT		DATE OF ISSUE
A 0			2011-06-07
Drawn	Checked	Reviewed	Approved

1. SCOPE

The specifications governs the performance of the following **RONDA** Nickel-Cadmium Cylindrical cell and its battery pack.(Refer to the attached figure 1)

Rated capacity: 1200mAh

Designation: KRXR 23/43 SC (D: 23.0⁰_{-1.0}mm H: 33.5⁰_{-1.5}mm)

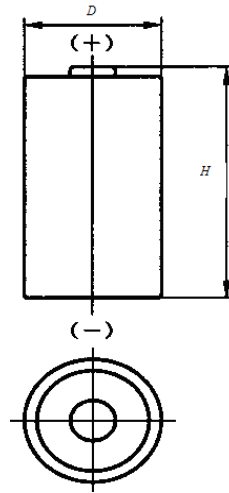


Figure 1- Jacketed cylindrical cells

2. DATA OF BATTERY PACK

The data of battery pack, including voltage and weight, is almost equivalent to the multiple numbers of the relevant single cells.

Example: Battery pack consisting three single cells

Nominal voltage of single cell = 1.2V

Nominal voltage of battery pack = 1.2V×3 = 3.6V

3. RATINGS

Table 1 - Ratings of the cells

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	Single cell
Rated Capacity	mAh	1200	Standard Charge/Discharge

4. PERFORMANCE

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

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

Relative Humidity: $65\pm 20\%$

Standard Charge/Discharge Conditions:

Preparative: Prior to charging, the cell shall be discharged by $240\text{mA}(0.2I_t\text{A})$ to 1.0V

Charge: $120\text{mA}(0.1I_t\text{A})\times 16\text{hours}$

Stand in charged condition: $1\sim 4\text{h}$

Discharge: $240\text{mA}(0.2I_t\text{A})$ to $1.0\text{V}/\text{Cell}$

Table 2 – Performance and test methods^b

Test Item	Unit	Specification	Test Conditions	Remarks	
Discharge performance	20 °C ^a	h	≥5	Standard Charge/Discharge	/
		min	≥54	After Standard Charge, stored for 1~4h, then discharged by 1200mA (1.0I _t A) to 0.9V.	/
		min	≥9	After Standard Charge, stored for 1~4h, then discharged by 6000mA (5.0I _t A) to 0.8V.	/
		min	≥4	After Standard Charge, stored for 1~4h, then discharged by 12000mA (10.0I _t A) to 0.7V.	/
	-18°C	h	≥4	After Standard Charge, stored for 16~24h in -18±2°C, then discharged by 240mA (0.2I _t A) to 1.0V in -18±2°C.	/
		min	≥36	After Standard Charge, stored for 16~24h in -18±2°C, then discharged by 1200mA (1.0I _t A) to 0.9V in -18±2°C.	/
		min	≥13	After Standard Charge, stored for 16~24h in -18±2°C, then discharged by 2400mA (2.0I _t A) to 0.8V in -18±2°C.	/
		min	≥7	After Standard Charge, stored for 16~24h in -18±2°C, then discharged by 3600mA (3.0I _t A) to 0.7V in -18±2°C.	/
Charge (capacity) retention	h/min	≥3h15min	After Standard Charge, stored on open circuit for a period of 28days, then discharged by 240mA (0.2I _t A) to 1.0V.	/	
Endurance in cycles	cycle	≥500	Appendix-table 3	/	
Endurance in cycles(accelerated)	cycle	≥500	Appendix-table 4	/	
	cycle		Appendix-table 5	/	
Permanent charge endurance	h	≥3	Appendix-table 6	/	
Over charge	h	≥5	Appendix-table 7	/	
Safety device operation	Not disrupt or burst		Undergo a forced discharge at constant current 240mA(0.2I _t A) to 0V. Then discharged by 1200mA (1.0I _t A) for 60min.	/	
Storage ^A	hour	≥5	Stored on open circuit for 12 months. Then standard charge/discharge.	/	
Internal resistance	mΩ	≤12	Within 1~4h after standard Charge (1000Hz)	/	
Weight	g	35.0(approx)	/	Reference	
Vibration	No leakage, no fire, no explosion		IEC 62133 2002 4.2.2	/	
Free fall	No fire, no explosion		IEC 62133 2002 4.3.3	/	

a) Five cycles is permitted b) Unless otherwise stated, the cell shall be discharged by 240mA(0.2I_tA) to 1.0V before test.

Notice: Test conditions is drawn according to IEC 61951-1 2003; Please refer to the related description of the standard.

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. 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) Prevent short circuit, do not incinerate or disassemble the cell/battery.
- (5) Do not solder directly to the cell/battery for a long time.
- (6) The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.
- (7) Store the cell/battery in a cool and dry place. Always discharge batteries before assemble or solder.
- (8) Always discharge batteries before bulk storage or shipment.
- (9) Do not mix batteries of different types and capacities.

Appendix

A) Endurance in cycles

Prior to the endurance on cycle test ,the cell shall be discharged at **240mA**($0.2I_tA$) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 3.

Table 3 Endurance in cycles

Cycle number	Charge	Stand in charged condition	Discharge
1	$0.1I_tA$ for 16h	none	$0.25I_tA$ for 2h20min
2~48	$0.25I_tA$ for 3h10min	none	$0.25I_tA$ for 2h20min
49	$0.25I_tA$ for 3h10min	none	$0.25I_tA$ to 1.0V
50	$0.1I_tA$ for 16h	1h~4h	$0.20I_tA$ to 1.0V ^a
a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or the cell voltage drops below 1.0V during 1~48 th cycle.			

B) Endurance in cycles(accelerated)

In order to accelerate the test or to use cycling conditions approximating those in actual application, one of the following alternative procedure relevant the cell be carried out as an alternative to **Endurance in cycles**.

Table 4 Endurance in cycles for H or X cells

Cycle number	Charge	Stand in charged condition	Discharge	
			Conditions	Total duration including subsequent rest
1	0.1I _t A for 16h	30min	1.0I _t A to 1.0V	90min
2~48	0.3I _t A for 4h	30min	1.0I _t A to 1.0V	90min
49	0.3I _t A for 4h	24min	1.0I _t A to 1.0V	90min
50	0.1I _t A for 16h	1h~4h	0.2I _t A to 1.0V	a

a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or the cell voltage drops below 1.0V on any 49th cycle

Table 5 Endurance in cycles for X cells

Cycle number	Charge	Stand in charged condition	Discharge	
			Conditions	Total duration including subsequent rest
1	0.1I _t A for 16h	30min	5.0I _t to 0.8V	42min
2~48	1.0I _t A for 1h	30min	5.0I _t A to 0.8V	42min
49	1.0I _t A for 1h	24min	5.0I _t A to 0.8V	42min
50	0.1I _t A for 16h	1h~4h	0.2I _t A to 1.0V	a

a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or on any 49th cycle becomes less than 5min.

Table 6 Endurance in cycles for HR/XR cells

Cycle number	Charge	Stand in charged condition	Discharge	
			Conditions	Total duration including subsequent rest
1	0.1I _t A for 16h	30min	1.0I _t to 1.0V	90min
2~48	1.0I _t A for ^a	30min	1.0I _t A to 1.0V	90min
49	1.0I _t A for ^a	24min	1.0I _t A to 1.0V	90min
50	1.0I _t A for ^a , Plus 0.1I _t A for 2h	1h~4h	0.2I _t A to 1.0V	b

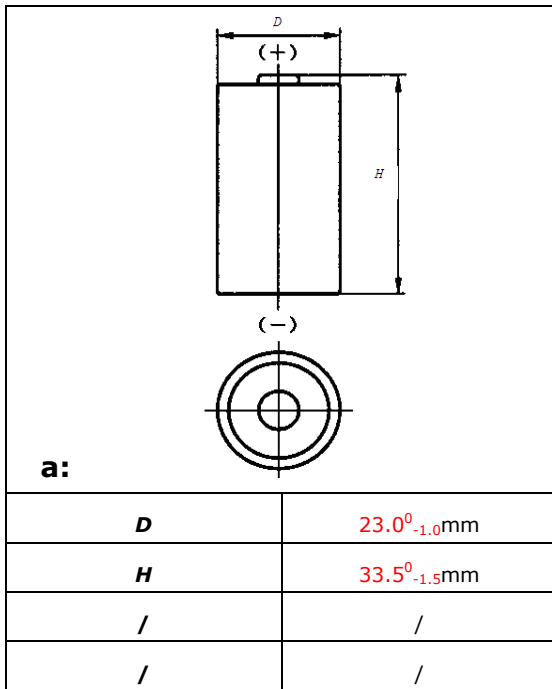
a) With appropriate charge termination, as recommended by the manufacturer, otherwise, charge for 1.2h;
b) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or on any 49th cycle becomes less than 30min.

C) Permanent charge endurance

Prior to the endurance on cycle test ,the cell shall be discharged at **240mA**($0.2I_tA$) to 1.0V.
The following test shall be carried out in accordance with the conditions specified in Table 7.

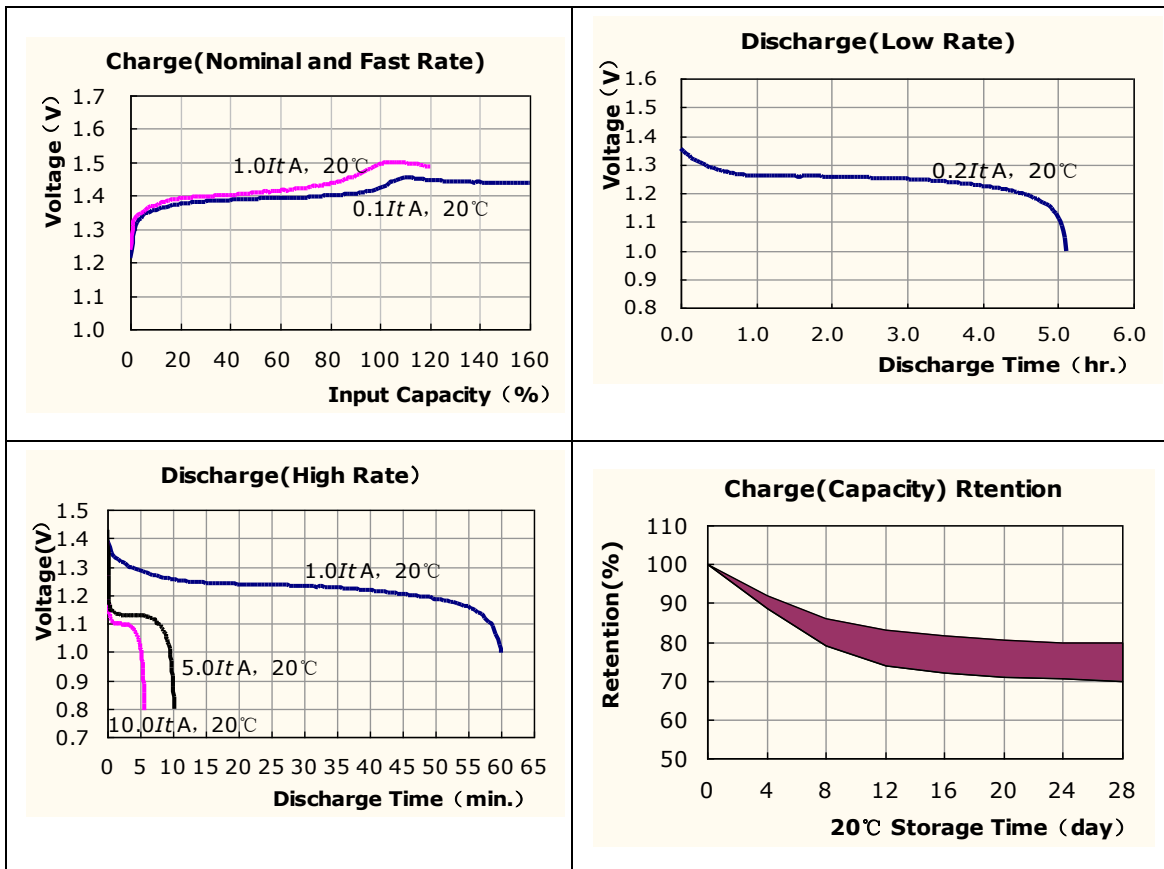
Table 7 Permanent charge endurance

Cycle number	Charge	Discharge ^a
1	0.051 I_tA for 91days	0.2 I_tA to 1.0V
2	0.051 I_tA for 91days	0.2 I_tA to 1.0V
3	0.051 I_tA for 91days	0.2 I_tA to 1.0V
4	0.051 I_tA for 91days	0.2 I_tA to 1.0V
a) The discharge is carried out immediately upon completion of discharge.		



Nominal voltage		1.2V	
Capacity comparison(mAh)		0.2I _t A	
		1.0I _t A	
		1200	
		1080	
Weight(g)		35.0	
Internal Impedance at 1000Hz (After Charge;mΩ)		≤12	
Charge current	Standard	120mA	
	Rapid	1200mA	
Charge time	Standard	16h	
	Rapid	72min, plus 2h by 0.1I _t A	
Ambient Temperature	charge	Standard	0~+35°C
		Rapid	+10~+35°C
	Discharge		-20~+45°C
	Storage		-20~+35°C

Electrical Performance:



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