The Source of Electric Power
MINAMOTO®
MINAMOTO BATTERY (HK) LTD.
Flat A-6, 8/F., Mai Hing Industrial Building, 16-18 Hing Yip Street, Kwun Tong, Kowloon, Hong Kong.
Tel: (852) 2793 4790 Fax: (852) 2793 4932 *e-mail : info@minamoto.com*

1. Scope
The document applies to CR14250 battery supplied by Minamoto Battery (HK) Ltd.

2. Battery type
Lithium Manganese Dioxide battery

3. Main characteristics

No.	Item	Characteristic	Remarks
3.1	Model	CR14250	
3.2	Nominal voltage	3.0V	
3.3	Standard discharge current	0.5mA	
3.4	Nominal capacity	800mAh	23±3ºC，0.5mA constant discharge to 2.0V cut-off.
3.5	Max constant current	7mA	23±3ºC, max current value with 50% normal capacity discharged to 2.0V cut-off
3.6	Max pulse current	70mA	23±3ºC, at 0.5mAwith discharge depth of 50% normal capacity, at 70mA for 15 seconds, yield battery voltage of no less than 2.0V.
3.7	Operating temperature	-30~+70ºC	
3.8	Recommend storage	Temperature：0~30ºC Humidity：<70% RH	
3.9	External dimension	Max: dia.14.5 x H25.6mm	Please refer to point 12. Product picture
3.10	Standard weight	~ 10.5g	
3.11	Annual self-discharge rate	≤2%	At 23±3ºCand humidity level <70% RH

4. Appearance and structure

4.1 Appearance
Cell appearance: no scratch, swelling, deformation, corrosion, electrolyte leakage and other defects.

4.2 Structure
CR14250 is bobbin type.

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5. Electrical performance typical value

Item	Test condition and others	Standard Value
Open Circuit Voltage	23±3ºC	≥3.10V
Load Voltage	23±3ºC, at the final stage of 1 second with 270Ω	≥2.95V
Standard discharge capacity	23±3ºC, 0.5mA，2.0V cut-off	≥800mAh
Rapid discharge capacity	23±3ºC, 4.5mA，2.0V cut-off	≥600 mAh

6. Safety and environmental performance

6.1 Environmental performance

6.1.1 Heating cycle test

Batteries are placed in a test chamber and subjected to the following cycles:

a＝ 30min raise to 70±3ºC, maintaining 4h.
b＝ 30min release to 20±3ºC, maintaining 2h.
c＝ 30min release to -40±3ºC, maintaining 4h.
d＝ 30minraise to 20±3ºC.
e＝Repeating the sequence for a 9 cycles.
f＝after 10 cycles, battery be static placed for 7 days.

Pass/Fail criteria: the samples shall not explode or catch fire. In addition, the samples shall no leakage.

6.1.2 Altitude Simulation

Sample batteries are to be stored for 6h at an absolute pressure of 11.6KPa (1.68psi) and a temperature of 20±3ºC（68±5°F）

Pass/Fail criteria: The batteries shall be no explosion or catch fire after the test. In addition the samples shall be no vent or leakage.

6.1.3 Fall test

Cell drop from 1.9m height onto cement ground (total 10 times).

Pass/Fail criteria: The battery samples shall be no explosion or catch fire. In addition, the samples shall no vent or leakage.

6.1.4 Vibration test

Battery vibration frequency is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz and last for 90 to 100 minutes, test in three mutually perpendicular directions.

Pass/Fail criteria: The battery samples shall be no explosion or catch fire. In addition, the samples shall no vent or leakage.

6.2 Safety test

6.2.1 Heating

Battery is heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±3ºC per minute to a temperature of 130±2ºC and remain for 10 minutes at that temperature before the test is discontinued.

Pass/Fail criteria: The battery samples shall be no explosion or catch fire.

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6.2.2 Impact
A test sample cell was placed on a flat surface. A 5/8 in. (15.8 mm) diameter steel bar was placed across the center of the sample. The length of the bar should be at least as long as the width of the sample. A 20 pound (9.1 kg) weight was dropped from a height of 24 ±1 in. (610 ±25 mm) on to the sample.
Pass/Fail criteria: The samples shall not explode or catch fire.

6.2.3 Crush test
A cell was crushed between two flat hard surfaces (i.e. steel). The crushing was continued until a force of 3000 pounds (13kN±0.78kN) was applied by hydraulic piston with a diameter of 32mm. Press continued until pressure reach up to 17.2Mpa. Once the maximum pressure was obtained, it was released.
Pass/Fail criteria: The battery samples shall be no explosion or catch fire.

6.2.4 Forced discharge
A completely discharged cell is to be force-discharged by connecting it in series with fully charged cells of the same kind. The number of fully charged cells to be connected in series with the discharged cell is to equal the maximum number less one of the cells to be covered for series use, the circuit load resistance less than0.1Ω. The sample is to discharge until a fire or explosion is obtained, or until it has reached a completely discharge state of less than 0.2V and battery case temperature has returned to ±10ºC (+18ºF) of ambient temperature.
Pass/Fail criteria：The samples shall be no explosion or catch fire.

6.2.5 External Short-circuit
Connect the battery positive and negative terminal with Cu wire(internal resistance ＜ 0.1 ohm), battery was discharged until a fire or explosion was obtained, or until it had reached a completely discharged and the cell case temperature had returned to room temperature.
Pass/Fail criteria: The battery samples shall be no explosion or catch fire.

6.2.6 Forced recharging
Tested battery is subjected to a charging current of three times of the current specified by the manufacturer by connecting to DC-power. The specified charging current is to be obtained by connecting a resistor of specified size and value.

The test time is calculated from the formula below:
Tc=2.5*C/ (3*Ic)
In which
Tc——charge time, hour, Tc≥7Hour；
C——Nominal capacity, Ah；
Ic——Max.charging current specified by manufacturer. (A)
Pass/Fail criteria：The samples shall be no explosion or catch fire.

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7. Delivery inspection
MINAMOTO will 100% inspect the open circuit voltage and load voltage of the delivered batteries, and test capacity, appearance and dimensions on a sampling basis for each delivery before shipped out.

Inspection items, order, sampling method:

No.	Item	Sampling（GB2828.1.2012）	
		QC level	AQL
7.1	Open voltage	Ⅱ	0.065
7.2	Load voltage	Ⅱ	0.065
7.3	Appearance	Ⅱ	1.0
7.4	Dimension	S-1	1.0
7.5	Capacity	As destructive testing, the customer can determine on the basis of the actual situation	

8. Storage
Battery should be placed in cool ,dry and clean environment, and the recommended surrounding temperature is 0~30ºC with humidity level of less than 70% RH，far away from the fire and heat source and not contact with corrosive substance.

9. Usage safety

9.1 Important Notes
8.1.1 Before use, do not remove the battery from the original packaging.
8.1.2 Do not scattered placed the battery together in order to avoid accidental short circuit.
8.1.3 Do not heat the battery above 80ºC or incinerated.
8.1.4 Do not charge or short the battery.
8.1.5 Do not mix with different brand, model or type batteries
8.1.6 Do not mix the new and used batteries.
8.1.7 Do not disassembly or open battery.
8.1.8 Do not reversely contact the positive and negative terminals.
8.1.9 Do not solder directly on the battery surface.
8.1.10 Do not test environment and safety under extrusion without any protection.
8.1.11 Do not throw the battery to water.

10. Transportation
Batteries should be protected against sunlight, fire, rain, immersion, and corrosive substances in transportation.

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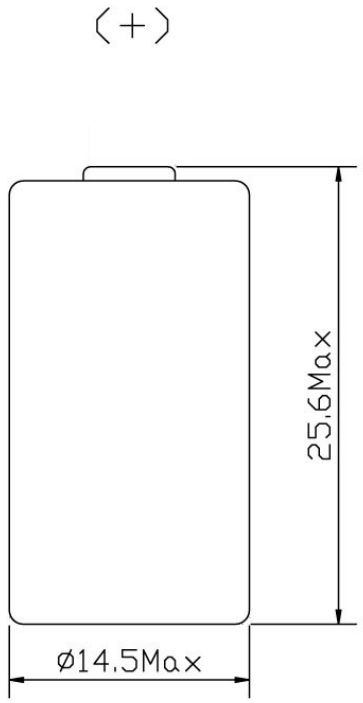
11. Warranty

The warranty period of our batteries is one year from the date of shipment under proper storage conditions or usage. Minamoto guarantees replacement in case the batteries are found to be defective due to manufacturing process instead of the customer abuse and misuse.

12. Statement

Before use MINAMOTO batteries, please operate or use the battery strictly according to the battery datasheet, any misuse may result in safety problem and cause body hurt or property loss. MINAMOTO will not be responsible for any unexpected accident due to misuse or not use according to the specific requirements or important notes written in this specification.

13. Product picture



Unit：mm