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Li-ion Cylindrical Battery

Specification

Model: ICR14500

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1. Scope

This specification is applied to ICR14500 Manufactured by **CHEAPE TECHNOLOGY INTERNATIONAL LTD** Product Specification

Table 1

No.	Item	Rated Performance		Remark
1	Rated Capacity	Typical	800mAh	Standard discharge（0.2C C_5A) after Standard charge
		Minimum	750mAh	
2	Nominal Voltage	3.7V		Mean Operation Voltage During Standard Discharge After Standard Charge
3	Voltage at end of Discharge	3.0V		Discharge Cut-off Voltage
4	Charging Voltage	4.2±0.03V		
5	AC (1KHz) Impedance New Cell Max.(mΩ)	≤80mΩ		The measure must be uses the new batteries that within one week after shipment and cycles less than 5 times
6	Standard charge	Constant Current 0.5C_5A Constant Voltage 4.2V 0.01 C_5A cut-off		Charge time : Approx 4.0h
7	Standard discharge	Constant current 0.2 C_5A end voltage 3.0V		
8	Fast charge	Constant Current 1C_5A Constant Voltage 4.2V 0.01 C_5A cut-off		Charge time : Approx 2.5h
9	Fast discharge	Constant current 1 C_5A end voltage 3.0V		
10	Maximum Continuous Charge Current	1 C_5A		
11	Maximum Continuous Discharge Current	1.5 C_5A		
12	Operation Temperature Range	Charge: 0~45℃		60±25%R.H. Bare Cell
		Discharge: -20~60℃		
13	Storage Temperature Range	Less than 1 year: -20~25℃		60±25%R.H. at the shipment state
		less than 3 months: -20~40℃		
14	Weight	Approx 20±1 g		Bare Cell
15	Cell Dimension	Diameter:14.3±0.2mm		Initial Dimension
		Height:50±0.5mm		

2. Performance And Test Conditions

3.1 Standard Test Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

3.2 Measuring Instrument or Apparatus

3.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

3.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10kΩ/V

3.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

3.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method(1kHz LCR meter).

3.3 Standard Charge\Discharge

3.3.1 Standard Charge ： Test procedure and its criteria are referred as follows:

$0.5C_5A$ =400mA

Charging shall consist of charging at a $0.5C_5A$ constant current rate until the cell reaches 4.2V. The cell shall then be charged at constant voltage of 4.2 volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to $0.01C_5A$. Charge time : Approx 4.0h, The cell shall demonstrate no permanent degradation when charged between 0 ºC and 45 ºC.

3.3.2 Standard Discharge

$0.2C_5A$ =160mA

Cells shall be discharged at a constant current of 0.2 C_5A to 3.0 volts @ 20º ± 5C

3.4 Appearance

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

3.5 Initial Performance Test

Table 2

Item	Measuring Procedure	Requirements
(1) Open-Circuit Voltage	The open-circuit voltage shall be measured within 24 hours after standard charge.	≥4.08V
(2) AC Impedance Resistance	The Impedance shall be measured in an alternating current method (1kHz LCR meter) after standard charge at 20±5℃.	≤80mΩ
(3) Nominal Capacity	The capacity on 0.2C_5A discharge shall be measured after standard charge at 20±5℃.	Discharge Capacity ≥750mAh

3.6 Temperature Dependence of Capacity (Discharge)

Cells shall be charged per 3.3.1. and discharged @0.2C_5A to 3.0 volts. except to be discharged at temperatures per Table 3. Cells shall be stored for 3 hours at the test temperature prior to discharging and then shall be discharged at the test temperature. The capacity of a cell at each temperature shall be compared to the capacity achieved at 23 ºC and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3.

Table 3

Discharge Temperature	-10℃	0℃	23℃	60℃
Discharge Capacity （0.2 C_5A）	50%	80%	100%	95%

3.7 Cycle Life and Leakage-Proof

Table 4

No.	Item	Criteria	Test Conditions
1	Cycle Life (0.2 C_5A)	Higher than 70% of the Initial Capacities of the Cells	Carry out 500cycle charging/ Discharging in the below condition. ◆Charge: Standard Charge, per 3.3.1 ◆Discharge:0.2 C_5A to 3.0V ◆Rest Time between charge/discharge:30min. ◆Temperature:20±5℃
2	Leakage-Proof	No leakage (visual inspection)	After full charge, store at 60±3℃ 60±10%RH for 1month.

3. Safety Test

Table 5

Item	Battery Condition	Test Method	Requirements
Crush	Fresh, Fully charged	Crush between two flat plates. Applied force is about 13kN(1.72Mpa) for 30min.	No explosion, No fire
Short Circuit	Fresh, Fully charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at room temperature(20±2℃).	No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃
Short Circuit	Fresh, Fully charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at temperature(60±2℃).	No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃
Impact	Fresh, Fully charged	A 56mm diameter bar is inlayed into the bottom of a 10kg weight. And the weight is to be dropped from a height of 1m onto a sample battery and then the bar will be across the center of the sample.	No explosion, No fire
Forced Discharge	Fresh, Fully charged	Discharge at a current of 1CmA for 2.5h.	No explosion, No fire
Nail Pricking (3mm)	Fresh, Fully charged	Prick through the sample battery with a nail having a diameter of 3mm and remain 2h.	No explosion, No fire

CAUTIONS IN USE

To ensure proper use of the battery please read the manual carefully before using it.

. Handling

- Do not expose to, dispose of the battery in fire.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Avoid shorting the battery
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not use the battery mixed with other different make, type, or model batteries.
- Keep out of the reach of children.

. charge and discharge

- Battery must be charged in appropriate charger only.
- Never use a modified or damaged charger.
- Do not leave battery in charger over 24 hours.

. storage

- Store the battery in a cool, dry and well-ventilated area.

. disposal

- Regulations vary for different countries. Dispose of in accordance with local regulations.

7. Battery operation instruction

7.1 Charging

Charging current：Cannot surpass the biggest charging current which in this specification book stipulated。

Charging voltage：Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage。

Charge temperature：The battery must carry on the charge in the ambient temperature scope which this specification book stipulated。

Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery。

7.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat。

7.3 Electric discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated

7.4 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity。

7.5 Storing the Batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery。

8. Period of Warranty

The period of warranty is one year from the date of shipment. Great Power guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customers abuse and misuse.

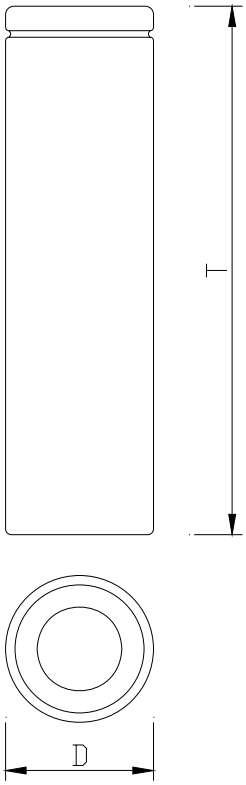
9. Other The Chemical Reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

10.Note:

Any other items which are not covered in this specification shall be agreed by both parties.

11. Initial Dimension:



D	14.3±0.2	H	50±0.5	UNIT	mm

Drawer		Checked		Approved		Date	

CHEAPE TECHNOLOGY

ICR14500 DRAWING

Drawing ID