



**Wuhan Lixing (Torch) Power Sources
Co., Ltd**

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Edition: A/0

Cylindrical Li/ SOCl₂ Battery

Specification

Model: ER14250

Edited:

Date:

Audited:

Date:

Authorized:

Date:

Customer: _____

Date: _____

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ER14250**1. Purpose**

1.1 In order to avoid errors and deviations by different testing method or condition, we established this specification to define the battery model and test method of lithium battery manufactured by Lixing.

1.2 Give some guidance for using our products.

2. Description and Model

Table 1

Description	Model
Li/SOCl ₂ Cylindrical Battery	ER14250

3. Normal characteristics

Table 2

No.	Items	Characteristics
1	Nominal Capacity	1200mAh (Continuously discharged under 0.5mA current till 2.0V end-point voltage at the temperature of 23℃±3℃)
2	Nominal Voltage	3.6V
3	Operating Temperature Range	-40~+85℃
4	Self-discharge Rate per Year	≤1%
5	Max. Pulse Current	100 mA
6	Max. Continuous Discharge Current	50 mA
7	Structures	thionyl chloride, lithium anode, acetylene black, separator, and stainless steel cell shell etc.
8	Weight for reference	10.0g

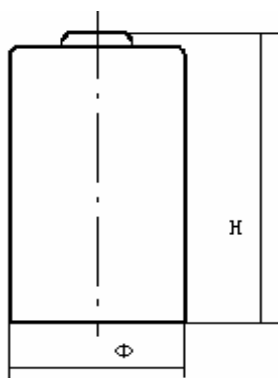
4. Outline figure and dimension**4.1 Outline figure is shown as follow**

Fig. 1 H : height; Φ: diameter

ER14250**4.2 Outline dimension**

Table 3

Model	Diameter Φ (mm)	Height H (mm)
ER14250	≤ 14.5	≤ 25.0

5. Appearance

The surfaces of the batteries are clean. The mark is clear. There should not be deformation、rust、stain or leakage.

6. Characteristics**6.1 Electronic characteristic**

Table 4

No.	Items	Standard		Test Method
1	Off-load Voltage	$\geq 3.65V$		The battery in delivery state should be stored for more than 24hours at the temperature of $23^{\circ}C \pm 3^{\circ}C$, a relative humidity of 45%~75%, and the voltage between the two terminals should be measured with a voltmeter at the same ambient environment.
2	Nominal Capacity	1200mAh		Continuously discharged under 0.5mA current till 2.0V end-point voltage at the temperature of $23^{\circ}C \pm 3^{\circ}C$
3	Temperature Characteristics	discharged at lower temp.	35% of nominal capacity	Continuously discharged under 0.5mA current till 2.0V end-point voltage at the temperature of $-40^{\circ}C \pm 2^{\circ}C$
		discharged at high temp.	95% of nominal capacity	Continuously discharged under 0.5mA current till 2.0V end-point voltage at the temperature of $60^{\circ}C \pm 2^{\circ}C$

6.2 Inspection for service output

6.2.1 10 samples should be tested for service output.

6.2.2 If the average value is equal to or more than the value of table 4 , and if the number of batteries showing a value less than 80% of the value of table 4 is 1 or less. The batteries are considered to conform to the requirement.

6.2.3 If the average value is less than the value of table 4 or if the number of batteries showing a value less than 80% is 2 or more, the test should be repeated with other 10 pieces. At the second test, if the average value is equal to or more than the value of table 4 and if the number of batteries showing a value less than 80% of the value of table 4 is 1 or less, these batteries are considered to conform to the requirement.

6.2.4 At above second test, if the average value is less than the value of table 4 or if the number of batteries showing a value less than 80% of the value of table 4 is 2 or more, the batteries are

considered not to conform to the requirement. A third test should not be performed.

6.3 Safety Characteristic

Table 5

No.	Items	Standard	Test Method
A	Altitude Simulation Test	NM、NL、NV、NC、NR、NE、NF	The batteries should be stored at the pressure of 11.6 KPa or less for at least six hours at ambient temperature $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.
B	Temperature Test	NM、NL、NV、NC、NR、NE、NF	Tested batteries are to be stored for at least 6 hours at a test temperature equal to $75 \pm 2\text{ }^{\circ}\text{C}$, followed by storage for at least 6 hours at a test temperature equal to $-40 \pm 2\text{ }^{\circ}\text{C}$. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all tested batteries are to be stored for 24 hours at ambient temperature $20 \pm 5\text{ }^{\circ}\text{C}$.
C	Vibration	NM、NL、NV、NC、NR、NE、NF	The battery should be subjected to a simple harmonic motion with an amplitude of 0.8mm(1.6mm total maximum excursion). The frequency is to be varied at the rate of 1Hz per minute between 10 and 55Hz. The test should be last 90min~100min and the battery should be tested in two mutually perpendicular direction.
D	Shock	NM、NL、NV、NC、NR、NE、NF	The battery should be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each battery should be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of the three mutually perpendicular directions. Each shock is to be applied in a direction perpendicular to the face of the battery. For each shock the battery is to be accelerated in such a manner that, during the initial 3ms, the minimum average acceleration is $75 \times 9.8\text{ m/s}^2$. The peak acceleration should be between $125 \times 9.8\text{ m/s}^2 \sim 175 \times 9.8\text{ m/s}^2$.
E	External Short Circuit	NT、NR、NE、NF	The battery to be tested should be temperature stabilized so that its external case temperature reaches $20 \pm 5\text{ }^{\circ}\text{C}$ and then the battery should be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at $20 \pm 5\text{ }^{\circ}\text{C}$. This short circuit condition is continued for at least one hour after the battery external case temperature has returned to $20 \pm 5\text{ }^{\circ}\text{C}$. The battery must be observed for a further six hours for the test to be concluded. The battery to be tested should have endured vibration and shock test.

F	Forced-discharge	NE、NF	Each battery should be forced discharged at ambient temperature of $23^{\circ}\text{C}\pm 3^{\circ}\text{C}$ by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. Each battery should be forced discharged for a time equal to the time in which a new battery is discharged to 2.0V .
G	Abnormal Charge	NE、NF	Sample batteries are to be connected reversely with a D.C. power supply , and subjected to a constant charging current at 3 times the I_c
H	Free Drop	NV、NE、NF	The not-discharged battery is to be dropped from a height of 1m onto a concrete surface. Each sample is to be dropped six times, two times in each direction. The sample should be examined 1 hours after testing
I	Heating Test	NE、NF	The battery should be placed in an oven. The oven temperature should be increased at a rate of $5^{\circ}\text{C}\pm 2^{\circ}\text{C}$ per minute until the oven reached $130^{\circ}\text{C}\pm 2^{\circ}\text{C}$. The oven should be maintained at $130^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 10min.
NM: no weight loss NL : no leakage NV: no venting NF: no fire NC : no short circuit NR: no rupture NE: no explosion NT: no overheating (the temperature at the surface of battery not exceed 150°C)			

7. Test condition

7.1 State of batteries:

The batteries should be in three months after the batteries been finished. The time when the batteries been finished is marked on the surface of batteries.

7.2 Normal testing environment:

If no special requirement, test should be made under the temperature of $15^{\circ}\text{C}\sim 25^{\circ}\text{C}$ and relative humidity of 45%-75%.

7.3 Test precision:

The measuring tolerances relative to the specified or actual values should be within these range:

Voltage	Current	Capacity	Temperature	Time	Weight	Dimension
$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 2^{\circ}\text{C}$	$\pm 0.1\%$	$\pm 0.1\%$	$\pm 0.1\%$

These tolerances include all errors caused by precision of testing instrument, testing method and testing process.

8. Packaging

Dimension of box	Net weight	Gross weight
406mm×287mm×165mm	13.5 KG	16 KG

Normal package : 1200 pcs per box.

9. Environment requirement

The product does not contain controlled substances of level 1.

10. Producing standard and certification

The batteries are produced according with the IEC standard, and have past UL, UN safety test.

11. Transportation

- The Batteries should be stored away from solarization, fire, rain, water, and never put together with corrosive during transportation.
- Vibration and shock during transportation and load-and-unload should be restrict to a minimum level.
- The height should not exceed 1.5m for cardboard packages.
- The batteries if transported by sea should be stored away from ship engines during prolonged transit, and not left for long periods in unventilated environment during summer.

12. Information for safety

! Danger

- Do not overheat batteries or dispose of batteries in fire.
- Do not put batteries together with metalwork such as necklace, coins, etc. in one bag, or store them together.
- Do not short-circuit batteries.
- Do not inset batteries in reverse. Observe the + and – markings on battery and equipment.
- Do not disassemble batteries.
- Do not weld or solder directly to batteries.
- Do not use deformed batteries or batteries with serious scar.
- Read the guide carefully before using batteries. Unsuitable operation will make batteries overheat, fire, explode, destroy or reduce battery's capacity.

! Warning

- Do not place the battery in heater, washer or high-pressure container.
- Do not use the battery together with different kind of or different type of battery.
- Stop using when the battery become heat, emit smell or appear other abnormality during use, or storing.
- Do not recharge the battery.
- Do not force-discharge the battery.
- Keep away from the battery when the battery is leakage or emit abnormal smell.
- Wash yourself quickly when the electrolyte infiltrate to your skin or clothes.

- Wash your eyes by clean water quickly and go to hospital for further check if the electrolyte infiltrate to your eyes.
- Please contact with us in advance If two or more batteries are to be connected in a series and / or placed in a parallel arrangement.

! Caution

- Keep it away from the children, avoid being swallowed.
- Read the guide carefully and pay attention to the guide when using the battery.
- Read the instrument guide carefully before installing the battery or uninstalling the battery from the instrument.
- Take out of the battery from the instrument if the on-load voltage of battery is less than 2V.
- Take out the battery and keep it under the condition of normal temperature and low humidity when the battery is not used in a long time.
- Clean the battery with dry cloth before use if the connection of the battery is dirty.
- Battery should be used and stored far from the electrostatic place.

13. Storage

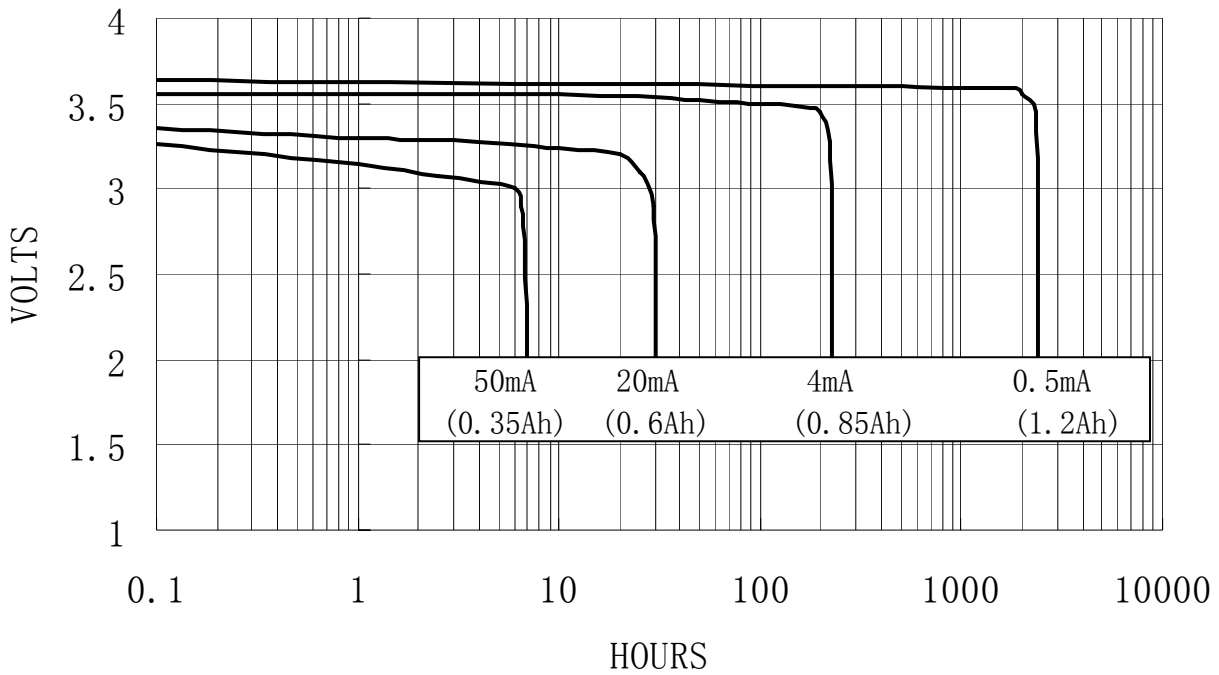
- The batteries should be stored at 10°C ~ 25°C (never exceed 30°C) , 45%~75%RH.
- The batteries should not be stored next to heat sources nor in direct sunlight. The storage area should be clean, cool, dry, ventilated and weatherproof.
- The height to which batteries may be stacked is clearly dependent on the strength of the packaging. As a general rule, this height should not exceed 1.5m for cardboard packages nor 3m for wooden cases.
- Store and display batteries in their original package. The batteries may be short-circuited or damaged if been unpacked and stacked müssily.

14. Declaration

- Please contact with Wuhan Lixing (Torch) Power Source Co., Ltd. If you have any question with this specification.
- Wuhan Lixing (Torch) Power Source Co., Ltd keep the right to change the specification.

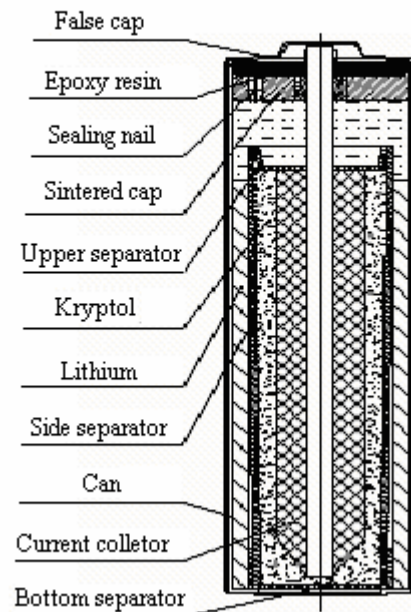
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Appendix 1 : Discharge curves on Different Current at 23°C



Appendix 2

**Battery Structural Drawing
Li-SOCl₂ Battery with High Capacity**



Appendix 3:

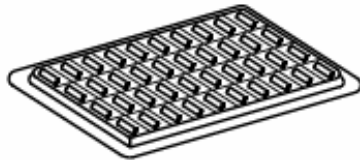
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Structure Figure of Package
ER14250 1200 Pcs Per Box

1. Battery

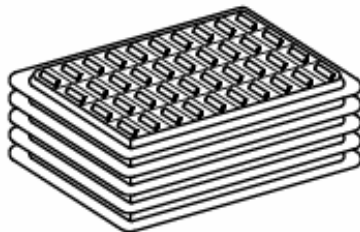


2. 40 Pcs Pre Plate

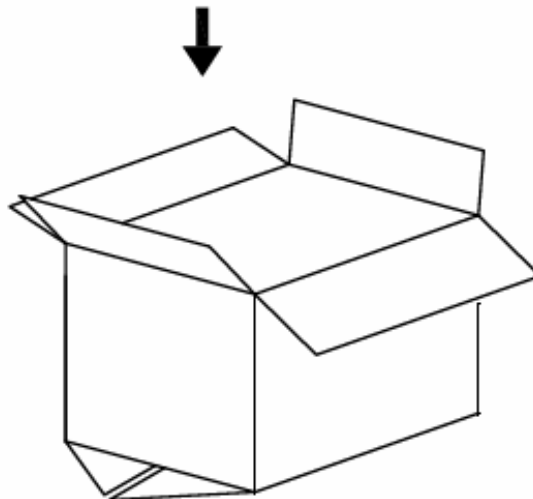


Outline Dimensions Of
Plate: 243 × 128 × 17

3. 5 Plates Per Min Package



4. 6 Min Package Per Box



Outline Dimensions Of
Box: 406 × 287 × 165
Net: 13.5 kg Gross: 16.0 kg