



## Specification Approval Sheet

**Name:** Lithium-Ion Battery

**Model :** INR14430-2S1P -7.5M

**SPEC :** 7.4V / 750mAh

**Number:** INR14430-2S1P -7.5M

### Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By
	Release 1	2025-01-08	

### Content

This specification describes the Product Specification of chargeable Lithium-Ion Battery produced by AKYGA.

**Any copies are invalid without our company's approval**

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## 1. Scope

This specification describes the performance, testing method, warning and caution of the Cylindrical lithium-ion battery.

This product is only applicable to recognized and confirmed models, and new parameters need to be reconfirmed.

The specification applies to Cylindrical lithium-ion battery supplied by Akyga Battery

## 2. Picture of battery

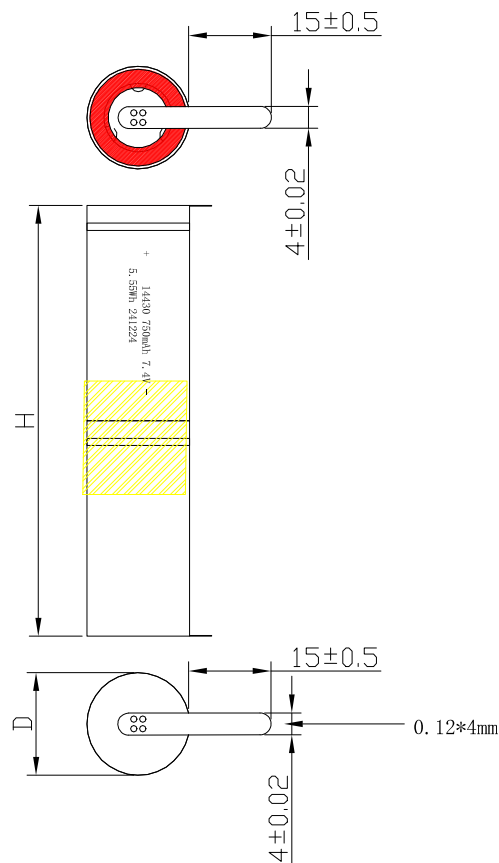


Fig. (1) The Dimension of Cell

Item	Specifications
D	$15.0 \pm 1.0$ mm
H	$87 \pm 2$ mm (Flat)

### 3. Basic Performance

#### Battery parameters

No.	Item	Specification
1	Rated Capacity	750mAh ,0.2C <sub>5</sub> A charging and discharging 0.2C <sub>5</sub> A
2	Minimum Capacity	730mAh ,0.2C <sub>5</sub> A charging and discharging 0.2C <sub>5</sub> A
3	Normal Voltage	7.4V
4	O.C.V	≥7.4V
5	Charge Ending Voltage	8.4±0.05V
6	Discharge Ending Voltage	6.0±0.05V
7	Standard charging	0.2C <sub>5</sub> A constant current charge to 8.4±0.05V, then constant voltage charge to cut off current at 0.02C <sub>5</sub> A
8	Charge current	Standard charge :0.2C <sub>5</sub> A
		Rapid charge :1.0C <sub>5</sub> A
9	charging Time	Standard charge :6.0~6.5h
		Rapid charge :1.5~2.0h
10	Max. Charging Current	1.0C <sub>5</sub> A
11	Standard discharging Current	0.2C <sub>5</sub> A
12	Max.continuous Discharging Current	3.0C <sub>5</sub> A
13	Operating environment	Standard charge : 0°C~+45°C
		Rapid charge : +10°C~+45°C
		Discharging -20°C~+60°C
14	Battery Impedance	≤160 mΩ , (8.4±0.05V AC 1KHz measured)
15	Appearance	Without scratch, distortion, contamination and leakage

#### 4. Test Requirement

##### 4.1 Normal Test Conditions

Temperature:  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Relative Humidity: 45%~85%RH

Atmospheric pressure: 86KPa ~106 KPa

##### 4.2 Measuring Instrument or Apparatus

###### 4.2.1 Dimension Measuring Instrument

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

###### 4.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than  $10\text{k}\Omega/\text{V}$

###### 4.2.3 Ammeter

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

###### 4.2.4 Impedance Meter

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

##### 4.3 Electrochemical Performance

NO.	Item	Criterion	Test Method
1	0.2C <sub>5</sub> A Discharging 0.2C <sub>5</sub> A	Discharging time is not less than 5h	After standard charging, rest 15min, then 0.2C <sub>5</sub> A discharge to ending voltage.
2	1 C <sub>5</sub> A Discharging 1 C <sub>5</sub> A	Discharging time is not less than 54 minutes	After Standard Charging, rest 15min, then 1 C <sub>5</sub> A discharge to ending voltage .

3	Cycle life	The cycle times is not less than 300	<p>Test condition:</p> <p>Temperature: <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></p> <p>Charge: <math>0.2C_5A</math> to 8.4V, 0.02C<sub>5</sub>A current cut off</p> <p>Discharge: <math>0.2C_5A</math> to 6.0V</p> <p>Such cycle, when the discharge capacity reduced to 80% of Min capacity, Stop testing.</p>
4	Capacity Retention	Remained capacity/ Initial capacity $\geq 85\%$	<p>After Standard Charging, then standard discharge, record the initial capacity, test condition:</p> <p>Temperature: <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></p> <p>Storage Time: 28days</p> <p>Then 0.2C discharge to ending voltage, and record as remained capacity, to calculate the remained capacity percentage.</p>

5	High temperature discharge	<p>Discharge Capacity/<math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> Discharge capacity<math>\times 100\%</math></p> <p>0.2C<sub>5</sub>A</p> <p><math>55^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></p> <p><math>\geq 95\%</math>;</p>	<p>Temperature: <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>, standard charging first, then standard discharge, record the initial capacity. Then standard charging, it is stored at <math>55^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> for 2~4 hours, then discharged to 6.0V at 0.2C<sub>5</sub>A, and record as remained capacity, to calculate the remained capacity percentage.</p>
6	Low temperature discharge	<p>Discharge Capacity/<math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> Discharge capacity<math>\times 100\%</math></p>	<p>Temperature: <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>, standard charging first, then standard discharge, record the initial capacity. Then standard charging, it is stored at <math>0^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> for 2~4 hours, then discharged to 6.0V at 0.2C<sub>5</sub>A, and record as remained capacity, to calculate the remained capacity percentage.</p> <p>Temperature: <math>23^{\circ}\text{C} \pm 2^{\circ}\text{C}</math>, standard charging first, then standard discharge, record the initial capacity. Then standard charging, it is stored at <math>-10^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> for 2~4 hours, then discharged to 6.0V at 0.2C<sub>5</sub>A, and record as remained capacity, to calculate the remained capacity percentage.</p>

#### 4.4 Safety Characteristics

NO	Item	Criterion	Test Method
1	Constant temperature and constant humidity test	No explosion, no fire, no leakage. Discharging time is not less than 3hours.	After Standard Charging, test condition: Temperature: $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Relative Humidity: 90~95%RH Storage Time: 48 hours Then return to room temperature for 2~4 hours, Then 0.2C <sub>5</sub> A discharged to ending voltage.
2	Vibration test	No explosion, no fire, no leakage.	After Standard Charging, fixed the cell to vibration table, then subjected to vibration test for 30 minutes per axis of XYZ axes. Frequency change time: 15 min Vibration frequency: 7Hz~200Hz~7Hz Excursion (single amplitude): 0.8mm
3	Free fall test	No explosion, no fire, no leakage.	Standard charge first, rest for 2~4 h, the battery is subjected to a drop, which has a height of 1m to an oak board of 18~20mm in six direction respectively one time.
4	Temperature cycle	No explosion, no fire, no leakage.	Standard charge first, store the battery for 6h in the test room with $75^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Take the battery out, $\leq 30\text{min}$ , store the battery for 6h in the room temperature with $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Take the battery out, $\leq 30\text{min}$ , store the battery for 6h in the room temperature with $75^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . cycle for 10 times;



5	Low pressure	No explosion, no fire, no leakage.	Each fully charged is placed in a vacuum chamber in an ambient temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Once the chamber has been sealed, its internal pressure is gradually reduced to a pressure equal to or less than 11.6 kPa held at that value for 6 h.
6	Overcharge test	No explosion, no fire.	Discharge : $1\text{C}_5\text{A}$ to 3.0V Charge : $3\text{C}_5\text{A}$ charge to 4.6V, and maintain 7 h or the battery temperature reduced to 20% below peak.
7	Over discharge testing	No explosion, no fire.	Standard discharge first, revise-charge the battery with $1\text{C}_5\text{A}$ for 90 minutes;
8	Thermal test	No explosion, no fire.	Put cell into an hot box, test condition: Temperature Rate : $5^{\circ}\text{C} \pm 2^{\circ}\text{C} /\text{min}$ Ending temperature : $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Keep temperature for 30 minutes , Then stop testing.
9	Crush	No explosion, no fire.	Each fully charged cell is crushed between two flat surfaces. The force for the crushing is applied by a hydraulic ram exerting a force of $13\text{ kN} \pm 0.78\text{ kN}$ . Once the maximum force is reached stop test.
10	Short circuit test	No explosion, no fire, Highest temp. $<150^{\circ}\text{C}$	After Standard Charging , Keep the cell at $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Short circuit the positive and negative , and the resistance of copper wire is $80 \pm 20\text{m}\Omega$ , When the temperature falls 20% lower than the peak , Stop testing or Short circuit time reached 24hours.

11	High temperature Short circuit test	No explosion, no fire, Highest temp. < 150°C	After Standard Charging, Keep the cell at 55 °C ± 2 °C, Short circuit the positive and negative, and the resistance of copper wire is 80 ± 20m Ω, When the temperature falls 20% lower than the peak, Stop testing or Short circuit time reached 24hours.
12	Impact	No explosion, No fire	A 15.8 ± 0.2mm diameter bar is placed into the bottom of a 9.1 ± 0.1kg weight. And the weight is to be dropped from a height of 610 ± 25mm onto a sample battery and then the bar will be across the center of the sample.
Note: Above testing of safe characteristics must be with protective equipment.			

## 5. Storage and Shipment Requirement

Item		Requirement
Storage environment	Short period less than 1 month	-20°C ~ +45°C, 65% ± 20%RH
	Long period more than 3 month	-10 °C ~ + 35°C, 65% ± 20%RH
	Recommend storage	+15°C ~ + 35°C, 65% ± 20%RH
<p>Long time storage</p> <p>If the cell is stored for a long time, the cell's storage voltage should be 3.7~ 3.9V and the cell is to be stored in a condition as No.5.0, The cell should be charged and discharged every 3 months;</p>		

## 6. Warning and Cautions

Danger warning (it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

- ◆ Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using.
- ◆ Do not discard or leave the battery near a heat source as fire or heater
- ◆ Being charged, using the battery charger specifically for that purpose
- ◆ Don't reverse the positive and negative terminals
- ◆ Don't connect the battery to an electrical outlet directly.
- ◆ Don't connect the positive and negative terminal directly with metal objects such as wire. Short terminals of battery is strictly prohibited, it may damage battery.
- ◆ Do not transport and store the battery together with metal objects such as necklaces, hairpins.
- ◆ Do not strike , throw or trample the battery.
- ◆ Do not directly solder the battery and pierce the battery with a nail or other sharp object
- ◆ Do not use lithium ion battery and others different lithium battery model in mixture
- ◆ Prohibition of use of damaged cells
- ◆ Don't fall, hit, bend battery body.
- ◆ Battery pack designing and packing Prohibition injury batteries.
- ◆ Never disassemble the cells
- ◆ The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

- ◆ Keep the battery away from babies.

#### Caution

- ◆ Do not use or leave the battery at very high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- ◆ Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- ◆ If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, eyes injury can result.
- ◆ If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.
- ◆ In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
- ◆ Prohibition of use of damaged cells
- ◆ Be aware discharged batteries may cause fire; tape the terminals to insulate them.

## **7. Note**

**Note (1):** The customer is requested to contact in advance if and when the variations of the operating conditions described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

**Note (2):** take no responsibility for any accident when the cell is used under conditions outside of this specification.

**Note (3):** inform the customer in writing of improvement(s) regarding proper use and handling of the cell if it is deemed necessary.

Energy reserves the right to revise this specification before the customer signs the datasheet. If a revision is required, notify the customer.

**Note (4):** The period of warranty is a year from the manufacture date.