

# **Specification Approval Sheet**

# Product Specification Li-ion Rechargeable Cell 3.6V 6mAh

(Model No.: LIR1025)



# 1 Scope

This specification is applied to the Li-ion rechargeable button cell in this Specification and manufactured by Akyga Battery

# 2 Product Specification

No.	Item	General Parameter		Remark
	Rated Capacity	Typical	6mAh	Standard discharge (0.2C <sub>5</sub> A) after
1		Minimum	5mAh	- Standard charge
2	Nominal Voltage	3.6V		Mean Operation Voltage
3	Voltage at end of Discharge	2.75V		Discharge Cut-off Voltage
4	Charging Voltage	4.2V		Charge Cut-off Voltage
5	Standard charge	Constant Current 0.2C <sub>5</sub> A Constant Voltage 4.2V 0.02 C <sub>5</sub> A cut-off		Charge time : Approx 6.0h
6	Standard discharge	Constant current 0.2C <sub>5</sub> A end voltage 2.75V		
7	Fast charge	Constant Current 0.5C <sub>5</sub> A Constant Voltage 4.2V 0.02 C <sub>5</sub> A cut-off		Charge time : Approx 3.0h



	-		
Continuous	41	401-1	_ 1
COMBINITIONS	$\Pi \cap \Theta$	Tam	_

Item	General Parameter	
	General Parameter	Remark
Fast discharge	Constant current 0.5C <sub>5</sub> A end voltage 2.75V	
Maximum Continuous Charge Current	1.0C <sub>5</sub> A	
Maximum Continuous Discharge Current	1.0C <sub>5</sub> A	
Operation Temperature Range	Charge: 0~45°C	65 ±20% R.H. Bare Cell
	Discharge : -20~ 60°C	Date Con
Storage Temperature Range	Less than 1 year: -20~25℃	65±20%R.H.
	less than 3 months: -20~45°C	at the shipment state
Cell Dimension	Height: 2.5mm (+0.1mm -0.2mm)	Initial Dimension
	Diameter: 10.0mm (-0.2mm)	initial Difficusion
Cell Weight	Approx 0.58g	
	Maximum Continuous Charge Current  Maximum Continuous Discharge Current  Operation Temperature Range  Storage Temperature Range  Cell Dimension	Fast discharge end voltage 2.75V  Maximum Continuous Charge Current $1.0C_5A$ Maximum Continuous Discharge Current $1.0C_5A$ Charge: $0\sim45^{\circ}C$ Operation Temperature Range Discharge : $20\sim60^{\circ}C$ Less than 1 year: $-20\sim25^{\circ}C$ Storage Temperature Range less than 3 months: $-20\sim45^{\circ}C$ Height: $2.5\text{mm} \ (+0.1\text{mm} -0.2\text{mm})$ Diameter: $10.0\text{mm} \ (-0.2\text{mm})$



### **Performance And Test Conditions** 3

### 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 specified, test and measurement shall be done under temperature of 25±2°C 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°C 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  $10k\Omega/V$ 

### 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  $0.01\Omega$ .

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

Charging shall consist of charging at a 0.2C<sub>5</sub>A constant current rate until the cell reaches 4.2V. The cell shall then be charged at constant voltage of 4.2V, while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.02C<sub>5</sub>A. Charge time: Approx 6.0h, The cell shall demonstrate no permanent degradation when charged between 0  $\,^\circ$ C and 45  $\,^\circ$ C. 3.3 Standard Charge

### 3.3.2 Standard Discharge

0.2C5A

Cells shall be discharged at a constant current of  $0.2C_5A$  to  $2.75V @ 25 \pm 2^{\circ}C$ 

3.3.3 If no otherwise specified, the rest time between Charge and Discharge amount to 30min.



### 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	Test Method and Condition	Requirements
Open-Circuit Voltage	The open-circuit voltage shall be measured within 24 hours after standard charge.	≥4.0V
Dimension	Measuring instrument: caliper	As item 2.13
Minimal Rated Capacity	The capacity on 0.2C <sub>5</sub> A discharge till the voltage tapered to 2.75V shall be measured after rested for 30min then finish standard charge.	Discharge Capacity ≥5mAh

### 3.6 Temperature Dependence of discharge capacity

Cells shall be charged per 3.3.1 and discharged @ $0.2C_5A$  to 2.75V. 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 25  $\,^{\circ}$ C and the percentage shall be calculated. Each cell shall meet or exceed the requirements of Table 3.

Table 3

Discharge Temperature	-10℃	0℃	25℃	60℃
Discharge Capacity (0.2C <sub>5</sub> A)	60%	80%	100%	95%



## 3.7 Cycle Life and Leakage-Proof

### Table 4

No.	Item	Criteria	Test Conditions
1	Cycle Life	Higher than 70% of the Initial Capacities of the Cells	Carry out 500cycle Charging/Discharging in the below condition.  Charge:0.2CsA Charge, per 3.3.1  Discharge:0.2CsA to 2.75 V  Rest Time between charge/discharge:30min.  Temperature:25 ±2 °C
2	Leakage-Proof	No leakage (visual inspection)	After full charge with standard charge, store at $60\pm3$ °C, $60\pm10$ %RH for 1 month.

# 4. Handling of Cells

### 4.1 Prohibition short circuit

Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or explosion that are very dangerous. The Li-ion cell tabs may be easily short-circuited by putting them on conductive surface. Such outer short circuit may lead to heat generation and damage of the cell. An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.



### 5. Others

### 5.1.Cell connection

- 1) Direct soldering of wire leads or devices to the cell is strictly prohibited.
- 2) Lead tabs with pro-soldered wiring shall be spot welded to the cells. Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

## 5.2. Prevention of short circuit within a battery pack

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

### 5.3. Prohibition of disassemble

1) Never disassemble the cells.

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems.

2) Electrolyte is harmful.

Li battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

### 5.4. Prohibition of dumping of cells into fire

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.

### 5.5. Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

### 5.6.Battery cells replacement

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.



### 5.7. Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

### **6. Storing the Batteries**

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that batteries be charged about once per half a year to prevent over discharge.

### 7. Other The Chemical Reaction

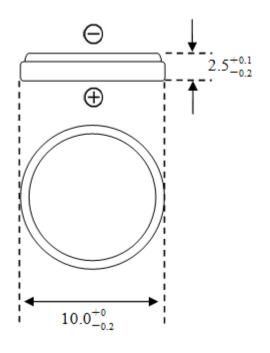
Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the 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.

### 8.Note:

Any other items which are not covered in this specification shall be agreed by customer and Akyga Battery.



# 9. Battery Dimensions/



Diameter	10.0mm(-0.2mm)		
Height	2.5mm (+0.1mm -0.2mm)		
		LIR10	25 6mAh 3.6V
		BATTE	RY DRAWING