

## 1. Scope

This product specification is applied to the following rechargeable cylindrical lithium-ion cell.

## 2. Description and Model

2.1 Description Cell (cylindrical lithium-ion rechargeable cell)

2.2 Model INR18650-15M

## 3. Nominal Specifications

3.1 Nominal Capacity	1500mAh (23±2°C, discharge at 0.2C)
3.2 Minimum Capacity	1450mAh (23±2°C, discharge at 0.2C)
3.3 Nominal Voltage	3.7V
3.4 Discharge Voltage	2.75V
3.5 Max Charge Voltage	4.20±0.05V
3.6 Standard Charge Current	0.5CmA (750mA) Cutoff voltage:4.2V; cutoff current: 75mA
3.7 Quick Charge Current	2 CmA (3000mA)
3.8 Standard Discharge Current	0.5CmA (750mA)
3.9 Maximum Continuous Discharge Current	-20<T≤ -10°C 5A -10<T≤ 0°C 10A 0<T≤ 20°C 15A 20<T≤ 60°C 20A (Capacity ≥80%, after 300 cycles at 25±3°C)
3.10 Maximum Pulse Discharge Current	50A at 25±3°C, <1s
3.11 Weight	41.5±2g
3.12 Max. Dimension	Diameter(Ø): 18.6mm Height (H): 65.5mm
3.13 Operating Temperature (Surface Temperature)	Charge: 0<T≤ 10°C 0.2C 10<T≤ 20°C 0.5C 20<T≤ 45°C 1C
3.14 Storage Temperature	1 month: -20 - 60°C, < 75%RH 3 month: -20 - 45°C, < 75%RH 12 month: -20 - 45°C, < 75%RH

## 4. Appearance

The surface of cell should be cleanness, and without scratch, break, contamination, rust, distortion, leakage and so on.

## 5. Characteristics

### 5.1 Safety & Mechanical Performances

Items	Test process	Requirements
5.1.1 Short Circuit	The cell is to be short-circuited by connecting the positive and negative terminals of the cell directly with copper wire with a resistance of less than 0.1Ω.	No fire, no explosion.
5.1.2 Impact Test	After complete charge according to the requirement of 3.6, put the cell on the table-board of impact instrument. And then put a steel cylindrical bar perpendicular to the longitudinal axis of cell. The 9.1kf weight is dropped form height of 01m and pounds the cell via steel bar.	No fire, no explosion.
5.1.3 Overcharge	The battery will be charged at 4.2V 5A for	No fire, no explosion.

		7hs, or, till no voltage increase, after standard charge.	
5.1.4	Hot Box Test	After standard charge, left it in the oven and heated at $(5^{\circ}\text{C}\pm 2)$ /min, up to $130\pm 2^{\circ}\text{C}$ and keep at $130\pm 2^{\circ}\text{C}$ for 10min .	No fire, no explosion.
5.1.5	Force Discharge	Reverse charge the cell at 1C for 90mins after standard discharge.	No fire, no explosion.
5.1.6	Vibration Test	The fully charged cell is fixed on a platform and vibrated in the X , Y and Z directions for 30minutes at the speed 10ct/min Frequency: 10~30Hz, Vibration amplitude 0.38mm. Frequency: 30~55Hz, Vibration amplitude 0.19mm.	During a visual check, no deformation should be visible. The cell should not leak, smoke and/or explode. The cell voltage should be not less than 3.6V.
5.1.7	Free Fall Test	After complete charge according to the requirement of 5.1, the cell falls freely from the height of 1m onto the 5mm solid wood board over the cement floor. It should be fallen for 2 times in each direction of positive, negative and side direction. When the test is finished, the cell should be kept for 2 hours, then discharge the cell to 3.0V with 1.0C.	No fire, no explosion.

## 5.2 Electrical Characteristics

No.	Items	Criteria	Test Method
5.2.1	Nominal Voltage	3.7V	Measure with voltmeter at $23\pm 2^{\circ}\text{C}$ .
5.2.2	Rated Capacity (0.2C)	$\geq 1450\text{mAh}$	Discharged after the standard charged cells rest 10min at $23\pm 2^{\circ}\text{C}$ ; Test can be discontinued when more than nominal capacity. Three cycles are permitted.
5.2.3	Discharge rate capability	Discharge Capacity: 1C: $\geq 93\%$ × initial capacity; 5C: $\geq 93\%$ × initial capacity; 10C: $\geq 95\%$ × initial capacity; 20A: $\geq 95\%$ × initial capacity;	Discharged after the standard charged cells rest 10min at $23\pm 2^{\circ}\text{C}$ . Three cycles are permitted.
5.2.4	Temperature Characteristics	1. Outside Appearance: No deformation, ruptures or leakage 2.Discharge Capacity: $50^{\circ}\text{C}$ : $\geq 100\%$ × initial capacity; $0^{\circ}\text{C}$ : $\geq 80\%$ × initial capacity; $-10^{\circ}\text{C}$ : $\geq 75\%$ × initial capacity	Measure the 0.2C capacity at $23\pm 2^{\circ}\text{C}$ as the initial capacity. Stored the rechargeable batteries for 4 hrs at $-10 \pm 2^{\circ}\text{C}$ ; 2h for $0 \pm 2^{\circ}\text{C}$ , $50 \pm 2^{\circ}\text{C}$ , and then 0.2C discharged at this temperature. Check the batteries' appearance after rest for 2 hrs at room temperature.
5.2.5	Storage Characteristics	Retention Capacity: $\geq 90\%$ × initial capacity	Measure the 0.2C capacity at $23\pm 2^{\circ}\text{C}$ as the initial capacity. Store the rechargeable batteries for 30 days at $23 \pm 2^{\circ}\text{C}$ and then rest for 2 hrs at room temperature, 0.2C discharged after checking the batteries' appearance.
5.2.6	Cycle Life	Capacity $\geq$ initial capacity $\times 80\%$	A cycle is defined as Standard Charge and 20A discharge, 45 minutes rest. Carry out 300 cycles.

## 6. Packing

Cells are at a 20-50% charged state when packed.

## 7. Transportation

During transport, do not subject the cell(s) or the box (es) to violent shaking, bumps, rain and direct sunlight.

## 8. Storage

Please keep the cell(s) in the cool and dry environment.

Keep the cell(s) at a half-charged state for storage over a period of 3 months.

## 9. Caution:

- a) Please read these specifications carefully before testing or using the cell as improper handling of a li-ion cell may result in lose of efficiency, heating, ignition, electrolyte leakage or even explosion.
- b) While testing the cell by charging and discharging, please use test-equipment especially designed for li-ion cell. Do not use ordinary constant current and constant voltage (CC/CV) power supplies. These do not protect the cell from being overcharged and over-discharged, resulting in possible loss of functionality or danger.
- c) When charging and discharging cells or packing them into equipment, reversing the positive and negative terminals will result in overcharging and over-discharging of the cell(s). This could lead to serious loss of efficiency and even explosions.
- d) Do not solder directly on the cell. Do not resolve the cell.
- e) Do not put cell(s) in pockets or bags together with metal products such as necklaces, hairpins, coins, screws, etc. Neither store them together without proper isolation. Do not connect the positive and negative electrode directly with each other through conductive materials. This can result in a short circuit of the cell.
- f) Do not beat, throw or trample the cell, do not put the cell into washing machines or high-pressure containers.
- g) Keep the cell away from heat sources such as fires, heaters, etc. Do not use or store cell(s) at locations where the temperature can exceed 60°C , such as in direct sunlight. This may lead to the generation of excessive heat, ignition and lose of efficiency.
- h) Do not get cells wet or throw them into water. When not in use, place the cells in a dry environment at low temperatures.
- i) While during use, testing or storing cells, cells become hot, distribute a smell, change color, deform or show any other abnormalities, please stop using or testing immediately. Attempt to isolate the cell and keep it away from other cells.
- j) Should electrolyte get into the eyes, do not rub the eyes, rinse the eyes with clean water and seek medical attention if problems remain. If electrolyte gets onto the skin or clothing, wash with clean water immediately.

## 10. Changes of specifications

The information in this specification is subject to change without prior notice.

## 11. For reference only

The information contained in this document is for reference only and should not be used as a basis for product guarantee or warranty. For applications other than those described here, please consult nearest Sales Office or Distributors.

### Appendix 1: battery dimension

