Specification Approval Sheet

INR**18650M-3350**

Specification Approval sheet

1 Scope/

This specification is applies to describe the related Battery product in this Specification and the Battery/cell supplied by Akyga Battery.

2 Model/ ： INR18650M-3350

3 Cell Specification/

No.	Items/	Specifications/		Remark
1	Nominal Capacity	3350mAh		0.2C Standard discharge 0.2C
2	Minimum Capacity	3150mAh		
3	Nominal Voltage	3.6V		Mean Operation Voltage
4	Charge Voltage	4.2V±0.03V		By standard charge method
5	Standard charging method	0.2C constant current,4.2V constant voltage charge to 4.2V,continue charging till current decline to ≤0.01C		
6	Fast Charge current	0.5C	1675mA	Rapid Charge, charge time about 3h(Ref)
7	Standard discharging method	0.2C constant current discharge to 2.5V		0.2C 恒 2.5V
8	Cell AC Internal Impedance	≤60mΩ		Internal resistance measured at AC 1KHz after 50% charge
9	Weight	47±2g		

3 Cell Specification/ (continuous/)

No.	Items/	Specifications/		Remark
10	Maximum charge current	0.5C	1675mA	Not for cycle
11	Maximum discharge current	1.0C	3350mA	Not for cycle Support 3C discharge peak current 支持3C峰值放电
12	Operation Temperature and relative humidity Range	Charge/	0~45℃ 60±25%R.H.	Charge at a very low temperature such as blew -10℃ ,will be get a lower capacity and reduce cycle life of the battery
		Discharge/	-20~65℃ 60±25%R.H.	
13	Storage temperature for a long time	-20~45℃ 60±25%R.H.		Do not storage exceed half year. Must charge once when storage for half year. Must charge the battery which with protect circuit when storage for three months.

4 Battery/Cell performance test Criteria

4.1 Appearance inspection by visual/

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

4.2 Environmental test condition/

Unless otherwise specified, all test stated in this product specification are conduct at below test condition

Temperature: 25±5℃

Relative Humidity: 60%±25% R.H.

4.3 **Cell Electrical characteristics/**

No	Items/	Test Method and Condition/	Criteria/
1	Rated Capacity at 0.2C (Min.)	After standard charge, the capacity shall be measured on 0.2C discharge till the voltage discharge to 2.5V	≥3150mAh
3	Cycle Life	Charging and discharging battery as blew conditions 0.2C standard charge to 4.2V end-off 0.2C standard discharge to 2.5V cut-off Continuous charge and discharge for 300 cycles ,the capacity will be measure after the300thcycle	≥80% of initial capacity
4	Capacity retention	The battery to be charge in accordance with standard charge condition at 20~30℃, then storage the battery at an ambient temperature 20~30℃ for 28 days. Measure the capacity after 28 days with 0.2C at 20~30℃ as retention capacity.	Retention capacity Recovery capacity
5	Temperature Dependence of discharge capacity	Before the battery is tested according to Table 3, it should be charged at room temperature according to the provisions of 3.5, then the battery should be stored at the test temperature for 3 hours, and discharged to 2.75V@0.2 C5A;The capacity of a cell at each temperature shall be compared to the capacity achieved at 25ºC and the percentage shall be calculated.	Each cell shall meet or exceed the requirements of Table 3

Table 3

Discharge Temperature	-10℃	25℃	40℃
Discharge Capacity/0.2 C_5A	≥75%	≥100%	≥95%

4.4 **Mechanical characteristics/**

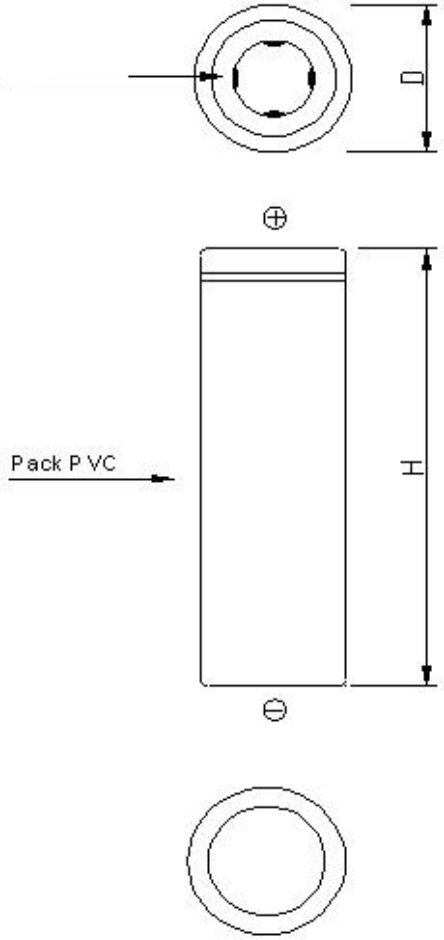
No	Items/	Test Method and Condition/	Criteria/
1	Free fall test	The cell to be fully charged in accordance with standard charge condition, then drop the cell three times from a height of 700mm onto a 20mm board. The positive and negative electrode of cell shall be tested once of the XYZ axes.	No smoking, No fire
2	Vibration test	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 16.7Hz, the excursion of the vibration is 2mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes.	No deformation, No leakage, No explosion , No fire

4.5 **Safety performance/**

No	Items/	Test Method and Condition	Criteria/
1	130 ℃ high temperature test	Each fully charged cell, stabilized at room temperature, is placed in a circulating air-convection oven. The oven temperature is raised at a rate of 5 °C/min to a temperature of 130 °C ± 2 °C. The cell remains at this temperature for 30 min before the test is discontinued.	No explosion, No fire

No	Items/	Test Method and Condition/	Criteria/
2	High and low temperature thermal exposure test	Each fully charged cell was placed in a low temperature environment at a temperature of -40℃ for 1 h, and then left at 85℃ for 1 h, the cycle was terminated 32 times. After the test, the sample was taken out and left in the standard environment for 6 h to visually inspect the sample.	No leakage, No explosion, No fire
3	Short test	The fully charged battery is to be short-circuited by connecting the positive and negative terminals of the battery with resistance load not exceed 100mΩ.Tests are to be conducted at room temperature about 25±2℃.	No explosion, No fire
4	Over charge test	After standard charge, continue to charge with a constant voltage 1C/6.3V per a cell, holding 1h.	No explosion No fire
5	Over discharge test	After standard discharge, continue to discharge at constant current of 0.2C until the voltage was 0V.	No explosion No fire
6	Constant temperature damp heat test	The fully charged battery is placed in a constant temperature and humidity chamber with a temperature of (40 ± 2)℃ and a relative humidity of 90% to 95% for 48 hours, and is allowed to stand for 6 hours under standard environmental conditions.	No leakage, No smoking, No fire

5 Cell initial Dimensions/



NO	Items	Units: mm
1	diameter/ (D)	18.3±0.3
2	Height/ (H)	65.2±0.3

6 Cautious 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 Period of Warranty/

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

8 Storage of 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.

9 Other Chemical Reactions/

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.