Specification for ICR18650

1、 Scope

1.1 This Specification applies to the lithium-ion rechargeable Battery ICR18650.

1.2 This Specification shall be applied to single cell.

2、 Type and Model

2.1 Type

lithium-ion Rechargeable Battery

2.2 Model

ICR18650(insulation tube is available upon request)

3、 Specification

Item		Specification	
		standard	Test condition
3.1 Nominal capacity		1800 mAh	Discharge current 0.2C_5A cutoff voltage 2.75V
3.2 Nominal voltage		3.7 V	
3.3 Discharge cutoff voltage		2.75 V	
3.4 Charge current		2C_5 A max	
3.5 Charge voltage		4.2V(max.4.25V)	
3.6 Charge time		7hours	Charge current 0.2C_5A
3.7 Continuous maximum charge current		2C_5 A	Cell temp.25 ℃ or less
3.8 Continuous maximum discharge current		2C_5 A	Cell temp.25 ℃ or less
3.9 Standard weight		44.5±0.5 g	Cell only
3.10 Operating temperature range	Charge	0 ℃ ~+45 ℃	
	Discharge	-20 ℃ ~+60 ℃	

4、 Dimension& Appearance

4.1 Dimension

Diameter： 18.2±0.2 mm

Length： 64.7± 0.5 mm

4.2 Appearance

There shall be no defects such as remarkable scratches, leakage or deformation.

5、 Performance

5.1 Standard Test condition

Test shall be carried out at 23±2 ℃ temperature with 25% to 85% relative humidity, unless otherwise specified.

Humidity can be discharged unless it affects test result.

5.2 Testing Instruments and Apparatuses

5.2.1 Dimension shall be measured by instruments with equal or more precision scale or 0.01mm specified by JIS B 7502(out micrometer) or JIS B 7503(dial gauge)

5.2.2 Voltmeter and Ammeter

Voltmeter and ammeter shall be equal or more precision instruments specified by JIS C 1102 (Indication Electric Instrument level 0. 5)

5.2.3 Internal resistance Gauge

An internal resistance shall be measured by a sine wave alternate current process(1KHz).

5.3 Rated charge condition

A charging current of $0.5C_5A$ for 3 hours with the maximum limit of 4.2V.

5.4 Rated discharge condition

A constant current of $0.5C_5A$ down to a 2.75 V cutoff at 23 ± 2 ℃.

5.5 Electrical characteristic

Item	standard		Test condition
5.5.1、Open Circuit Voltage	3.6V Minimum		Measure the open circuit voltage at 23±2℃ in the shipment state (50% discharge).
5.5.2、Internal Resistance	80 mΩ Maximum		Measure the battery with 1 KHz AC at 23 ± 2 ℃ in the shipment state (50% discharge).
5.5.3、Rated Capacity	120 min Minimum		Duration time on rated discharge shall be measure after rated charge at 23±2℃
5.5.4、Battery Capacity 1	300 min Minimum		$0.2C_5A$ down to a 2.75V cut off discharge after rated charge at 23±2℃
5.5.5、Battery Capacity 2	120 min Minimum		$0.5C_5A$ down to a 2.75V cut off discharge after rated charge at 23±2℃
5.5.6、Battery Capacity 3	60 min Minimum		$1.0C_5A$ down to a 2.75V cut off discharge after rated charge at 23±2℃
5.5.7 、 Charge/Discharge Cycle 1	250 cycles 90 min Minimum		Discharge(2.75V)after rated charge at 23±2℃.Repeat the charge/discharge cycle 250 times.
5.5.8 、 Charge/Discharge Cycle 2	300 cycles 96 min Minimum		Discharge(2.75V)after rated charge at 23±2℃.Repeat the charge/discharge cycle 300 times.
5.5.9、Self Discharge 1	1	103 min Minimum	Duration time on rated discharge shall be measured after rated charge and then storage at 23±2℃. for 28 days.
	2	120 min Minimum	After measured sell discharge Characteristic, duration time on rated discharge shall be measured after rated charge.
5.5.10、Self Discharge 2	1	103 min Minimum	Duration time on rated discharge shall be measured after rated charge and then storage at 23±2℃. for 28 days.

	2	120 min Minimum	After measured sell discharge Characteristics, duration time on rated discharge shall be measured after rated charge.	
5.5.11、Temperature Characteristics	More than the value in the table		Duration time shall be measured at rated charge and rated discharge at the temperature shown in the following table.	
	Charge temperature		Discharge temperature	Duration time
	0℃		23℃	113 min
	23℃		23℃	120 min
	55℃		23℃	120 min
	23℃		20℃	100 min
	23℃		0℃	109 min
	23℃		55℃	120 min

5.6 Reliability

Item	Standard	Test condition
5.6.1、Heat Cycle Test	No leakage	10 cycles exposure of the following condition after rated charge. 60℃,1h ◀⟷▶ -20℃,2h 1h
5.6.2、Drop Test	No leakage 101 min Minimum	Drop the battery in the shipment condition(50% discharge) form 2m height onto 5cm or thicker concrete with p-tile on it 2 times each of x, y, and z directions at 23±2℃
5.6.3、Vibration	No leakage 101 min Minimum	The battery pack shall be rated charged. Then it shall be tested at the following condition. The discharge time of the second discharge, rated charge, and rated discharge. Vibration frequency(Hz) G 100 ~ 59 2.1 60 ~79 1.4 80 ~99 0.7 100 ~125 0.4 Sweep time log 5min Time direction of x, y, z 1hour

6、 Vent (Rupture)

The most possible danger would be the sudden rise of internal pressure witch causes the explosion or the cell.

A Safety device is built inside the cell to prevent the cell from such an explosion, when the internal pressure of the call increased abnormally.

7、 Call condition at the shipment

About 50% discharged

8、 Handling Instructions

8.1 Temperature range

*charging： 0 ℃ ~45 ℃

*discharge： -20 ℃ ~60 ℃

*storage： -20 ℃ ~45 ℃

8.2 Charging

*The lithium-ion rechargeable battery must be charged with a maximum limit of voltage and current limit.

* Maximum limit voltage：4.25V

*Maximum charging current： $2C_5A$

8.3 Discharging Turn on electricity the announcements

* Maximum charging current： $2C_5A$

* Avoid discharging below 2.75 V

8.4 Operation

*The battery must not be connected with the charger not exclusively designed for this battery

*The battery must not be applied for other equipment.

8.5 Protect circuits

The battery must posses three types of protective circuits follows.

8.5.1 Over-charging protective circuit

The over-charging protective circuit shall operate at 4.25 to 4.35 volts, lower voltage is desirable;

8.5.2 Over-discharging protective circuit

The over-discharging protective circuit shall operate at 2.0 to 2.75 volts, then discharge current must decrease to less than 10 micro amperes.

8.5.3 Excessive-current protective circuit

The protective circuit must operate at charging or discharging at over 3C current

9、 Warning for Using the Lithium Ion Rechargeable Battery

9.1 Observe the following in using the battery

*Do not beat or throw into the fire.

* Do not disassemble

* Do not set up or leave in high temperature (80℃ or more) in device

* Do not short positive (+) and negative(-) terminal with a metal

* Do not wet in the water

* Do not give a hard shock or drop

* Do not solder lead lines to the battery in directs

9.2 Charging

*Charge within the limits of 0℃ to +45℃ temperature

* Do not charge reversibly

* Charge only with charge exclusively designed for this battery

9.3 Discharging

*Discharge with the limits of -20℃ to +60℃ temperature

*Avoid discharging below 2.75V，do not over-discharge below 1.0V

*Discharge within a designated current

*Use only as a power source for a designated device

9.4 Storage

*Discharge completely for the long-term storage

*Store dry and low temperature area，do not store in a high temperature area.