

<b>Polymer Lithium-ion battery Product Specification</b>	<b>Doc. No.</b>	Q/WMDCJ06005-2004
	<b>Edition No.</b>	2.0
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### 1. Scope

This product specification describes Wanma polymer lithium-ion battery. Please use the test methods that is recommend in this specification. If you have any opinions or advices about the test items and methods, please contact us. Please read the cautions recommended in the specifications first, take the credibility measure of the cell's using.

### 2. Product Type, Model and Dimension

2.1 Type: Polymer lithium-ion battery

2.2 Model: 503440

2.3 Cell Dimension (Max, Thickness×Width×Length, mm<sup>3</sup>): 5.0×34.0×40.5

Pack Dimension (Max, Thickness×Width×Length, mm<sup>3</sup>): None

### 3. Specification

Item	Specifications	Remark
Nominal Capacity	650 mAh	0.2C <sub>5</sub> A discharge
Nominal Voltage	3.7V	Average Voltage at 0.2C <sub>5</sub> A discharge
Charge Current	Standard: 0.2 C <sub>5</sub> A; Max: 1C <sub>5</sub> A	Working temperature: 0~40°C
Charge cut-off Voltage	4.20±0.03V	
Standard Discharge Current	0.2C <sub>5</sub> A	Working temperature: -20~60°C
Max Discharge Current	2.0C <sub>5</sub> A	Working temperature: 0~60°C
Discharge cut-off Voltage	2.75 V	
Cell Voltage	3.7-3.9 V	When leave factory
Impedance	≤ 50 mΩ	AC 1KHz after 50% charge
Weight	Approx: 14 g	
Storage temperature	≤1month	-20~45°C
	≤3month	0~30°C
	≤6month	20±5°C
Storage humidity	65±20% RH	Best 20±5°C for long-time storage

### 4. General Performance

**Definition of Standard charging method:** At 20±5°C, charging the cell initially with constant current 0.2C<sub>5</sub>A till voltage 4.2V, then with constant voltage 4.2V till current declines to 0.05C<sub>5</sub>A.

Item	Test Methods	Performance
4.1	0.2C Capacity	After standard charging, laying the battery 0.5h, then discharging at 0.2C <sub>5</sub> A to voltage 2.75 V, recording the discharging time.
4.2	1C Capacity	After standard charging, laying the battery 0.5h, then discharging at 1C <sub>5</sub> A to voltage 2.75 V, recording the discharging time.
4.3	Cycle Life	Constant current 1C <sub>5</sub> A charge to 4.2V, then constant voltage charge to current declines to 0.05C <sub>5</sub> A, stay 5min, constant current 1C <sub>5</sub> A discharge to 2.75 V, stay 5min. Repeat above steps till continuously discharging time less than 36min.
4.4	Capability of keeping electricity	20±5°C, After standard charging, laying the battery 28days, discharging at 0.2C <sub>5</sub> A to voltage 2.75 V, recording the discharging time.

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## 5. Environment Performance

Item		Test Methods	Performance
5.1	High temperature	After standard charging, laying the battery 4h at 60℃, then discharging at 0.2C <sub>5</sub> A to voltage 2.75V, recording the discharging time.	≥270min
5.2	Low temperature	After standard charging, laying the battery 4h at 0.2C <sub>5</sub> A, then discharging at 0.2C <sub>5</sub> A to voltage 2.75V, recording the discharging time.	≥210min
5.3	Constant humidity and temperature	After standard charging, laying the battery 48h at 40±2℃, RH 93±2%. Recording 0.2C <sub>5</sub> A discharging time	No distortion No electrolytes leakage ≥270 min
5.4	Temperature shock	After standard charging, battery stored at -20 for 2 hours, then stored at 50 for 2 hours. Repeat 10 times.	No electrolytes leakage

## 6. Mechanical Performance

Item		Test Methods	Performance
6.1	Vibration	After standard charging, put battery on the vibration table. 30 min experiment from X,Y,Z axis. Scan rate: 1 oct/min; Frequency 10-30Hz, Swing 0.38mm; Frequency 30-55Hz, Swing 0.19mm.	No influence to batteries' electrical performance and appearance.
6.2	Collision	After vibration test, batteries were laying on the vibration table about X, Y, Z axis. Max frequency acceleration: 100m/s <sup>2</sup> ; collision times per minutes: 40~80; frequency keeping time 16ms; all collision times 1000±10.	No influence to batteries' electrical performance and appearance.
6.3	Drop	Random drop the battery from 10m height onto concrete one times.	No explosion or fire

## 7. Safety Test

**Test conditions:** The following tests must be measured at flowing air and safety protection conditions. All batteries must standard charge and lay 24h.

Item		Test Methods	Performance
7.1	Over charge	At 20±5℃, charging batteries with constant current 3C <sub>5</sub> A to voltage 4.8V, then with constant voltage 4.8V till current decline to 0. Stop test till batteries' temperature 10℃ lower than max temperature.	No explosion or fire
7.2	Over discharge	At 20 ± 5℃, discharge battery with 0.2C <sub>5</sub> A continuously 12.5h.	No explosion or fire
7.3	Short-circuit	At 20±5℃, connect batteries' anode and cathode by wire which impedance less than 50mΩ, keep 6h.	No explosion or fire
7.4	Extrusion	At 20±5℃, put the battery in two parallel steal broad, add pressure 13kN.	No explosion or fire
7.5	Thermal shock	Put the battery in the oven. The temperature of the oven is to be raised at 5±1 per minute to a temperature of 650±2 and remains 60 minutes.	No explosion or fire