

PRODUCT SPECIFICATION XCell X9V-250

APPLICATION: The applicable range: This specification is available only for the testing within one month since receipt of batteries. It's not a standard for stored goods..

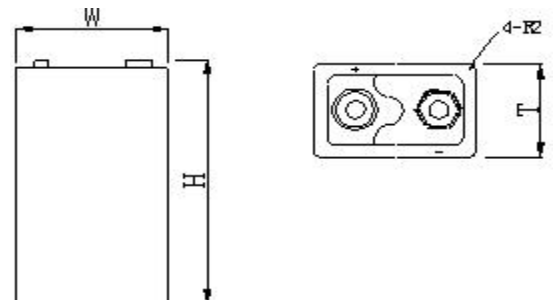
1. Ratings

Nominal Voltage	8.4 V
Nominal	250mAh
Minimum	240mAh/0.2C
Standard charge rate	25mA×16hrs
Rapid charge rate	125mA×140min (-ΔV= 5mV/pcs)
Operating temperature range / Humidity: +65%± 20%	
Standard charge	0~40°C(32 to 104°F)
Rapid charge	+10~40°C(50 to 104°F)
Floating charge	-10~40°C(14 to 104°F)
Discharge	-20~55°C(-4 to 131°F)
Storage temperature range /Humidity : +65%±20%	
Within 1 year	-20°C~35°C(-4 to 95°F)
Within 6 months	-20°C~45°C(-4 to 113°F)
Within 1 month	-20°C~50°C(-4 to 122°F)

- 1 All rapid charge methods should be discussed with our engineer.
- 2 We stipulate to charge less than 50% fully power for delivery, if the charge is more than 50%, the battery has a certain latent risk. If the charge requirement is over 50% which caused quality problem, executed after the mutual consultation .
- 3 During storage period the batch battery is requested by the 50% electric charge, the battery storage surpasses 3 months, the recommendations 0.2C discharge to 7.0V and then add 50% of the electricity storage.
4. Our battery guarantee time: 12 months.

2. Measurement & Dimensions (cell)

W	max 25,5mm
T	max 17,5mm
H	max 48,5 mm



3. Performance Testing

3.1 TEST CONDITIONS

- 3.1.1 The battery to be tested is the product within one month after being received by customer.
- 3.1.2 Ambient conditions:
 - 20±5°C Temperature +20°C±5°C
 - 65±20% Humidity +65%±20%

3.2 Testing Tools

- 3.2.1 Voltage meter 0.5 level or higher as required in IEC51/IEC485. Internal impedance exceeds 10KΩ/V.
- 3.2.2 Current meter 0.5 level or higher as required in IEC51/IEC485. Internal impedance should be less than 0.01Ω/V(including wires).
- 3.2.3 Micrometer caliper With precision of 0.02mm.
- 3.2.4 Internal impedance meter Alternating current of 1000HZ, connector measuring equipment with sin wave of 4.
- 3.2.5 Impedance loaded meter Value of impedance is with +5% error allowed (including external wires).

3.3 Test methods and benchmarks

Item	Test Methods	Benchmark
1. Appearance	eyeballing	Batteries shall be free from any stains; scratches or deformations, which may reduce the commercial value when visually inspected
2. Size	caliper measurement	The size shall comply with the specified size as the attached drawing
3. Insulate impedance	Measured with a Megger overpack and battery electrode between the degree of insulation	Outer sleeve shall exceed 10MΩ
4. Weight	Using disk-scale measurement	Approximate 53 g
5. Charge Voltage	Following a period of discharge at 0.2CmA down to a terminal voltage of 7.0V, standard charge, the cell or battery shall be checked at 5 minutes before finish charging	The voltage shall be less than 11.2V
6. Open circuit voltage: (O.C.V.)	Following a standard charge period, the open circuit voltage of the cell or battery shall be checked within 1 hour.	The O.C.V. shall exceed 8.75V
7. Closed circuit voltage: (C.C.V.)	Following a standard charge period, the closed circuit voltage of the cell or battery shall be checked with a 6.02 Ω load within 1 hour	The C.C.V. shall exceed 8.4V
8. Internal impedance	Following a standard charge period, the internal impedance of the cell or battery shall be checked at 1000Hz within 1 hour	The internal impedance shall not be more than 750mΩ
9. Capacity	Following a standard charge period, the cell shall be stored for a period of 1 hour. The capacity shall be equal or more than minimum capacity when discharged at 0.2C mA down to a terminal voltage of 1.0V The capacity returned might not initially attain the specified value following the first charge – discharge cycle. In this event, the test may be repeated a further two or three times to attain the minimum capacity	The capacity is greater than or equal to the minimum capacity
10. High Drain Discharge	To discharge by 0.5C to 7.0V within 1 hour after standard charge	The Capacity is higher than or equal to 108 min
11. Self discharge	Following a period of discharge at 0.2CmA down to a terminal voltage of 7.0V, standard charge and then the cell or battery shall be stored for 28 days below 20°C	The subsequent capacity shall not be less than 70% of rated capacity when discharged at 0.2C mA
12. Over-charge	Following a period of discharge at 0.2CmA down to a terminal voltage of 7.0V, standard charge and then charge for 48hrs at 0.1C mA. The capacity of the cell or battery shall not be less than the rated capacity when discharged at 0.2C mA	It shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
13. Over-discharge	Following a period of discharge at 0.2C mA down to a terminal voltage of 7.0V, combine the cells with a 6.0Ω load. After stored for a period of 24 hours, standard charged and then discharge at 0.2CmA	the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed, and the subsequent capacity shall not be less than 80% of rated capacity
14. Cycle Life	Based on clause IEC61951-2(2017) (Reference standard test conditions)	The charge-discharge cycles shall exceed 500 times
15. Humidity	Standard charge and store for 14 days under the following storage conditions: 33°C±3°C(91.4°F±5.4°F), Relative humidity of 80%±5%. (Salting is permitted).	No leakage of electrolyte in liquid form shall be observed
16. Vibration	Store the cell or battery more than 24 hours after standard charge, following vibration tests over an amplitude of 4 mm (0.1575 inches) at a frequency of 16.7 Hz(1000 cycles per minute) and repeated through any axes during 60mins	The subsequent fluctuation of open circuit voltage and internal impedance shall be less than 0.14 V and 35 mΩ respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.

17. Free falling: (Drop)	Store the cell or battery more than 24 hours after standard charge, following a drop test from 450mm (17.717 inches) on to a hardwood board in a vertical axis 2 times on each of 2 mutually perpendicular axes	The subsequent fluctuation of open circuit voltage and internal impedance shall be less than 0.14 V and 35 mΩ respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
18. Short-circuit testing	To store it for 1 hour after standard charged, and to make positive and negative electrode short-circuit with a wire with the section 0.75mm ² min and short-test length, the shortcircuit time is 1 hour	It shall not explode during or at the end of a 1 hour short-circuit test. However, leakage of electrolyte, external deformation or outer sleeve cracking is permitted.
19. Safety Valve Performance (Over discharging)	The battery to 0.2C discharge to 0V, then raise the current 1.0C discharge 60min	The safety valve must start normally , battery without breakage;Leakage, distortion and outer package breakage are allowed
20. Safety Valve Performance (over charging)	To be charged with 0.5C mA for 5 hours	No explosion, but leakage, distortion and out package breakage are allowed
21. To discharge at low temperature	T be stored for 24 hours at 0°C±2°C, and discharged at 0.2C mA at 0°C±2°C	Discharge duration shall exceed 3 hour and 30 min

Remark: /IEC Cycle life: IEC61951-2(2017)

Cycles	Charge	rest	Discharge
1	0.1C×16hrs	0	0.25C×2hrs 20mins
2~48	0.25C×3hrs 10mins	0	0.25C×2hrs 20mins
49	0.25C×3hrs 10mins	0	0.25C to 1.0V/cell
50	0.1C×16hrs	1~4hrs	0.2C to 1.0V/cell

Cycle 1~50 shall be repeated until the discharge duration on any 50th cycle become less than 3hrs

4. The transportation and storage

4.1 Transportation

In the transportation process the battery should maintain at clean, dry, and the well ventilated environment, and prevents the fierce vibration, the impact or the extrusion, prevents to be exposed to the sun and rain. Battery could be transported by automobile, train, steamboat ,airplane and other transportation vehicle.

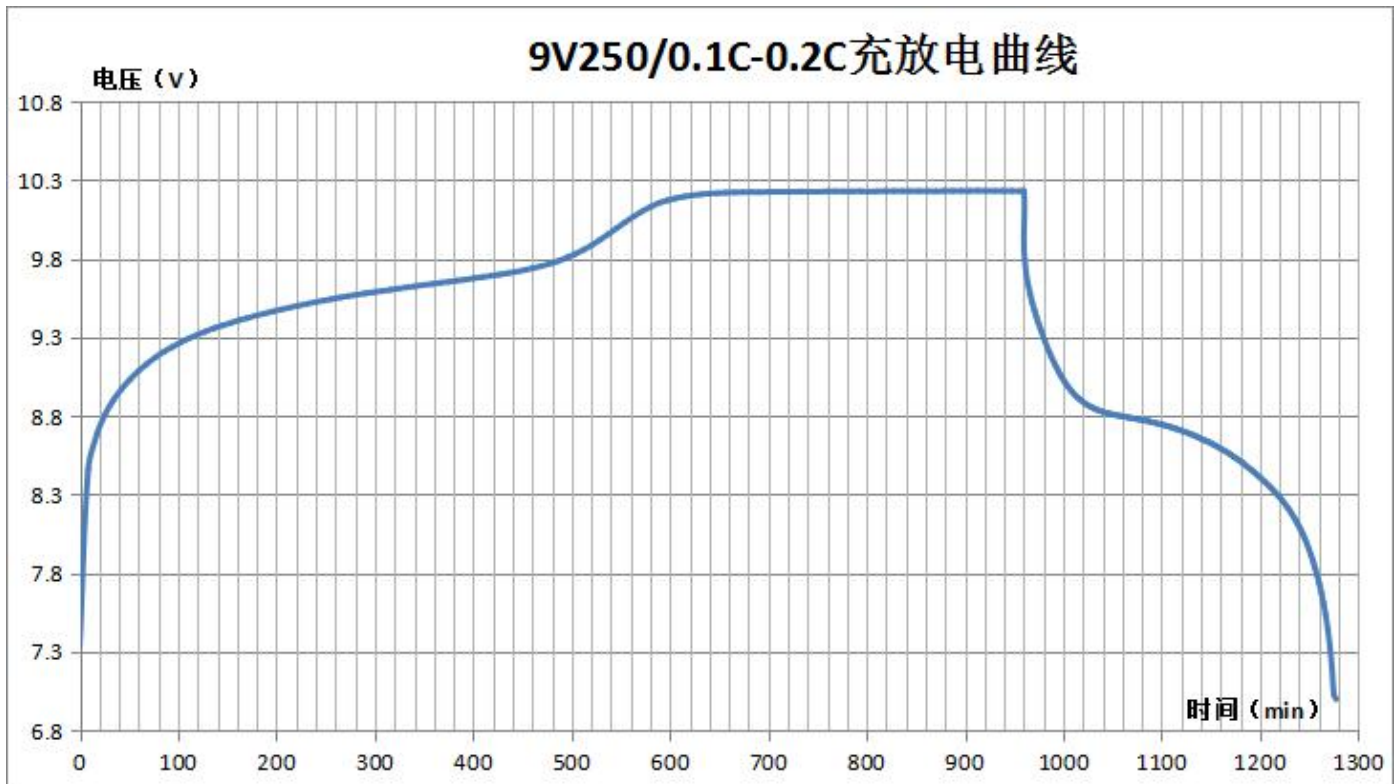
4.2 Storage

4.2.1 Battery must be stored at -20°C ~ +35°C, (It is best at 15°C ~ +25 °C) and put in the clean, dry and ventilated place with relative humidity 85% max. It must be kept away from corrodent substance, fire hazard and heat resource.

4.2.2 Storage placement way

The packed battery in a carton stack less than 5 layers, to guarantee that between the cell box has the good air circulation condition, please maintain between the carton above 5~10 cm distance, which prevents the safety incident caused by a pile of agglomeration to heat

5. Charging and discharging curves(cell)



6. Warning and Security

To prevent the impact of equipment failure caused by the battery, and to make sure the security of circuit and battery set, please consider below things when design and produce the production equipment.

Danger!

- (1) Against the following matters will result in battery leakage, heat, explosion, fire and serious personal injury!
- (2) Prohibited to throw the BPI battery into fire or heat!
- (3) Prohibited to collide or throw BPI battery!
- (4) Don't weld the lead on the BPI battery directly.
- (5) Don't put the BPI battery on a place which is more than 1.5 meter in case of dropping. Don't drop it at the height of more than 1.5 meter.
- (6) Don't connect the positive pole and electrode pole directly of BPI battery, such as leading wire. If the tab terminal of poles doesn't set insulation covering, please don't transport or store. Please don't touch the metal necklace, key or any other conductive material. Please use special carton when transport or store.
- (7) Must use the charger appointed by BPI to charge BPI batteries, and follow the instructors of BPI.
- (8) Prohibited to disassemble BPI batteries. It will cause external or internal short circuit, and the exposed parts will have chemical reaction then result in very dangerous heat, explosion, fire or splash of electrolyte.

Warning!

- (1) Don't contact batteries with water, sea water or other oxidation reagents, which will cause rustiness and heat. If batteries get rusty, explosive decompression valve won't work and will lead to explosion.
- (2) Don't over-charge BPI batteries, that is, don't continually charge batteries despite the designed charging time. If the batteries are not fully charged within the designed charging time, please stop to charge. The delay of charging time will lead to leakage, heat and explosion.
- (3) BPI NI-MH battery includes the colorless strong alkaline liquor (i.e. electrolyte), if the skin or clothes touch BPI NI-MH battery liquor, please use the boron acid water or the vinegar acid water to clean, after that, with the clear water thoroughly flushes. Because the battery's electrolyte can corrode the skin.

- (4) It is forbidden for more than 20 pcs batteries in series. Because it will result in leakage, getting shock or giving off heat.
- (5) Don't disassemble the battery, as it will result in short-circuit, leakage, giving off heat, catching fire and explosion.
- (6) Don't use the batteries when they are leakage, any color deterioration, distortion or other changes are found. Otherwise it will get hot, catching fire or explosion may happen.
- (7) Please keep the batteries and other electronic products related to battery away from baby, children, to avoid accident of swallowing of battery. If there is any accident, please go to see the doctor.
- (8) To use new battery when the working time of the battery is far short from the initial working time, as the cycle life of this battery is finished.

7. Others

- 8.1 BetterPower reserve the right to change and amend the process design and specifications without prior notice;
- 8.2 Anything not mentioned in this specifications, customer and BetterPower should discuss to get a solution;
- 8.3 BetterPower does not undertake any responsibility for the accidents caused by actions not matching with specifications(Man-made short circuit to burn out).