S P E C I F I C A T I O N S

1.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.

Model: HR-C3000

2.RATINGS

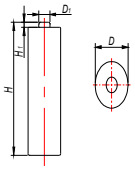
Nominal Voltage	1.2 V
Nominal	3000 mAh
Minimum	2900 mAh/0.2C
Standard charge rate	300 mA × 16h
Rapid charge rate	1500 mA ×140min (stop when voltage reduce to 5mV)
Value of dT/dt (for reference only)	1 to 2 ℃/min
Operating temperature range	Humidity: +65%± 20%
Standard charge	0 to +45℃(32 to 113℉)
Rapid charge	0 to +40℃(32 to 104℉)
Discharge	-10 to +55℃(14 to 149℉)
Storage temperature range	Humidity : +65%±20%
Within 1 year	-20 to +35℃(-4 to 95℉)
Within 6 months	-20 to +45℃(-4 to 113℉)
Within 1 month	-20 to +55℃(-4 to 131℉)
Within 1 week	-20 to +55℃(-4 to 149℉)

Note : （1） Specified capacity figures are based on single cell performance.
（2） All rapid charge systems should be discussed with our engineer.
（3） We stipulate to charge only 30% fully power for delivery, while only 50% for blister with 2pcs or below, and only 30% with over 2pcs. If customer requires charged power to exceed what we stipulate, MICROBATT won't be responsible for this during delivery and storage.
（4） shelf life: 12 months.

3. Measurement & Dimensions

to see the drawing:

D	25.0~26.0mm
H	49.0~50.5mm



4. Performance Testing

4.1. TEST CONDITIONS

4.1.1 The battery to be tested is the product within one month after being received by customer.

4.1.2 Ambient conditions:

Temperature +20°C±5°C

Humidity +65%±20%

4.2 Testing Tools

4.2.1 Voltage meter:

0.5 level or higher as required in IEC51/IEC485. Internal impedance exceeds 10KΩ/V.

4.2.2 Current meter:

0.5 level or higher as required in IEC51/IEC485. Internal impedance should be less than 0.01Ω/V(including wires).

4-2.3. Micrometer caliper:

With precision of 0.02mm.

4-2.4. Internal impedance meter:

Alternating current of 1000HZ, connector measuring equipment with sin wave of 4.

4-2.5: Impedance loaded meter:

Value of impedance is with ±5% error allowed (including external wires).

4.2.6 Incubators Accuracy ±2°C

4.3 Test methods and benchmarks

Item	Test Method	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 10 MΩ。
4. Weight	◇ using disk-scale measurement。	◇ approximate 65.0 g。
5. Charge Voltage	◇ Following a period of discharge at 1CmA down to a terminal voltage of 1.0V, standard charge, the cell or battery shall be checked at 5 minutes before finish charging。	◇ The voltage shall be less than 1.6 V。
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 1.25 V per cell。
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 0.86 Ω per cell load within 1 hour。	◇ The C.C.V. shall exceed 1.2 V per cell 。
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 30 mΩ per cell。
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	◇ To discharge at 0.2C,the capcity is greater than or equal to the minimum capacity。

	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。	
10. Over-charge	◇ Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, 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。
11. Over-discharge	◇ Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, combine the cells with a 0.86 Ωper cell load. After stored for a period of 24 hours, standard charged and then discharge at 0.2C mA。	◇ 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。
12. Self discharge	◇ Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, standard charge and then the cell or battery shall be **stored for 28 days** below 20℃。	◇ The subsequent capacity shall not be less than **60%** of rated capacity when discharged at 0.2C Ma。.
13. Cycle Life	◇ Based on clause 7.4.1.1, IEC61951-2 2003。	◇ The charge-discharge cycles shall exceed 500 times。
14. Humidity	◇ Standard charge and store for 14 days under the following storage conditions：33℃±3℃(91.4℉±5.4℉)，Relative humidity of 80%±5%. (Salting is permitted)。	◇ No leakage of electrolyte in liquid form shall be observed。
15. 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 0.02 V and 5 mΩ respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed. 。
16. 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 hard-wood 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 0.02 V and 5 mΩ respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed。
17. Short-circuit testing	◇ to store it for 1 hour after standard charged, and to make positive and negative electrode short-circuit with	◇ It shall not explode during or at the end of a 1 hour short-circuit test. However, leakage

	a wire with the section 0.75mm^{2}min and shortest length, the short-circuit time is 1 hour	of electrolyte, external deformation or outer sleeve cracking is permitted. ◦
18. Safty Valve Performance (Over dis-charging)	◇ to be charged with 1C mA for 5 hours	◇ safety valve can work normally, no breakage, leakage, distortion and out package breakage are allowed
19. Safty Valve Performance (over charging)	◇ to be charged with 1C mA for 5 hours	◇ No explosion, but leakage, distortion and out package breakage are allowed
20.To discharge at low temperature	◇ to be stored for 24 hours at 0℃ ±2℃, and discharged at 0.2C mA at 0℃±2℃ ◦	◇ discharge duration shall exceed 3 hour(s) 30 min(s) ◦

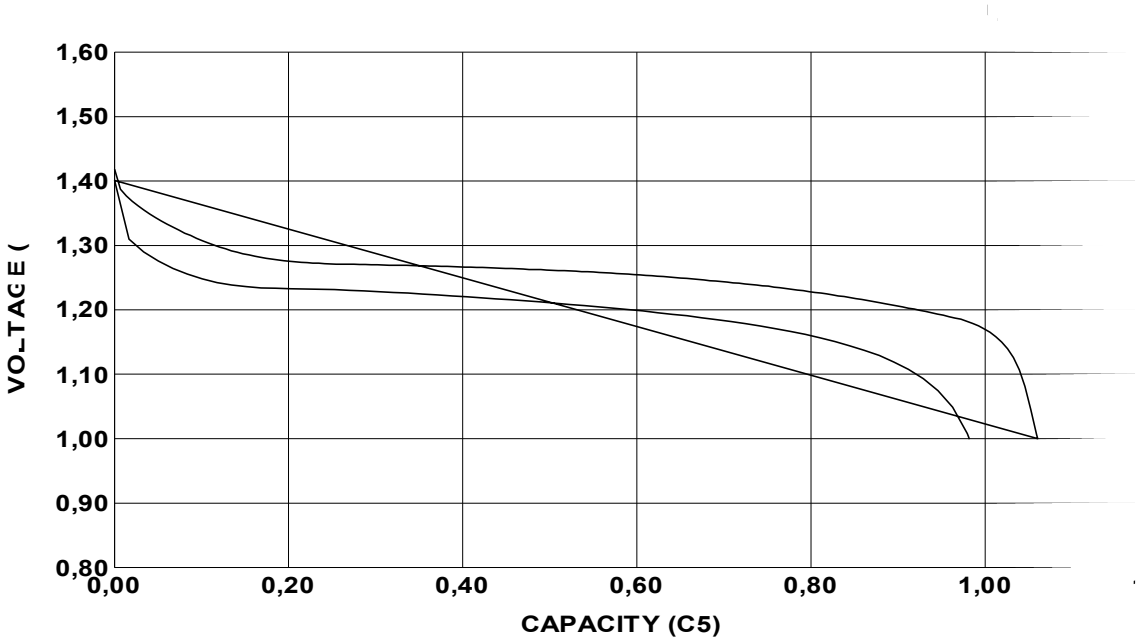
5. The transportation and storage

5-1 During transportation, it should be prevented from fierce vibration, impact ,extrusion, insolating or drenching under clean, dry and ventilated place. Applicable in transportation by automobile, train, steamboat and airplane.

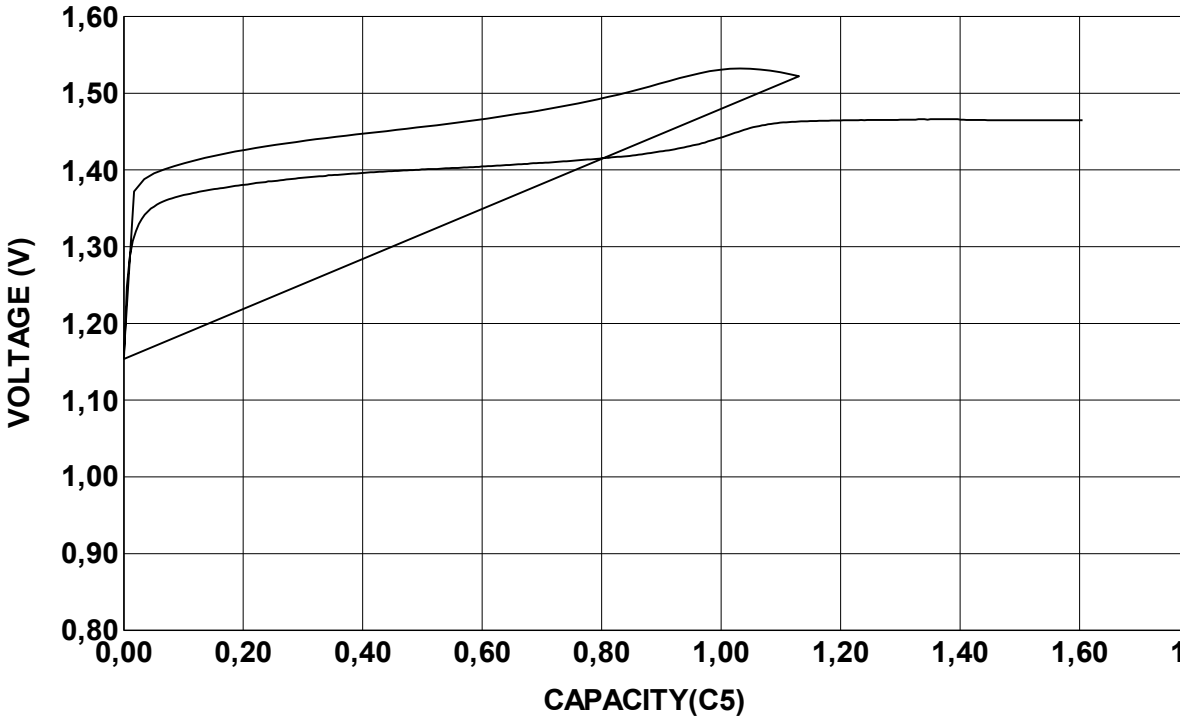
5-2. It must be stored at -5 ℃ ~ +35 ℃, and put in the clean, dry and ventilated place with relative humidity 75% max.. It must be kepet away from corrodent sustance, fire hazard and heat resource.

6. Discharging and charging curves

6-1. Discharging Curves



6-2. Charging Curves



7. Others:

7-1. MICROBATT reserve right to revise the specification without notification;

7-2. Anything not mentioned in this specifications, customer and MICROBATT should discuss to get a solution;

7-3. MICROBATT does not undertake any responsibility for the accidents caused by actions not matching with specifications.