VAPCELL TECHNOLOGY CO., LTD
Kstar Industry Park, No.7 Road, HighTech Industrial Zone,Guangming New District ,
Shenzhen, Guangdong, China.

Vapcell W33 3300mWh Specification

Model No.型号 ：Vapcell W33 3300mWh

Specification: 1.2V /2800mAh

Approved by

	Section	Confirm	checked	Approval
	Name			
	Approve			

Presented by

Vapcell	Written 拟定	滕建
	Quality checked 品质审核	刘涛

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Model 型号	Execution date 执行日期	Edition explain 版本说明	edition no. 版本号
Vapcell W33 3300mWh	2020-4-28	Written 拟定	A1.0

	Approval 批准	陈春洪

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1.适用范围(Scope):

本规格书用于本文中涉及到的深圳市菲亚特科技有限公司密封可充电镍氢电池.

The specification applies to the following sealed Ni-M rechargeable battery made by NANCHHANG BAI LES El ectronic THCHNOLOGY CO., LTD

型号(TYPE)：Vapcell W33 3300mWh

2. 电池型号 CELL TYPE AND RATINGS

规格 Type	Vapcell W33 3300mWhmAh
容量 Capacity	**2800mAh/0.2ItA**
标称电压 Nominal cell voltage	**1.2V**
内阻 Internal impedance	≤40mΩ
单体电池重量 Weight of the single cell	**约26.5g**
单体电池直径 Diameter	**14.5**$^{+0}_{-07}$mm
单体电池高度 Height	**50.5**$^{+0}_{-10}$mm

3.最佳使用条件 BEST EXPLOITATION CONDITIONS

充电电流 Charge current	**200mA（0.1ItA×16h）≤ I≤400mA（0.2ItA×7.5h）**
充电控制 Charge control method	**Time**
充电环境温度 Temperature range for charge	**15℃~25℃**
最大相对湿度 MAX humidity	**65±20%**
放电电流 Discharge current	**200mA（0.1ItA）≤ I≤ 1000mA（0.5ItA）**
放电环境温度 Temperature range for discharge	**15℃~25℃**
贮存温度 Temperature range for storage	**0℃~25℃.**

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4. 可使用条件 PERMISSION EXPLOITATION CONDITIONS

低倍率充电 **Low rate charge**	
电流 Current	**200mA（0.1ItA×16h）≤I＜800mA（0.4ItA×3h）**
充电控制 Control method	**Time**
环境温度 Ambient temperature	**-10℃~40℃**
环境湿度 Humidity	**65±20%**
高倍率充电 High rate charge	
电流 Current	**800mA（0.4ItA×3h）≤I≤1000mA（0.5ItA×2.4h）**
充电控制 Control method	**-ΔV=10mV/cell 、Time、TCO=45℃，dT/dt=1℃/3min~2℃/3min**
环境温度 Ambient temperature	**-10℃~40℃**
环境湿度 Humidity	**65±20%**
放电 **Discharge**	
可循环持续放电电流 Can be recycled continues discharge current	**200mA（0.1ItA）≤I≤1000mA（0.5ItA）**
放电终止电压 Cut-off voltage	**1.0V/cell（I≤1ItA）** **0.9V/cell（1ItA＜I≤2ItA）**
环境温度 Ambient temperature	**-10℃ ~55℃（0.2ItA＜I≤1ItA）**
环境湿度 Humidity	**65±20%**
贮存 Storage	
一周以内 Within a week	**-20℃~35℃**
六个月以内 Within six months	**10℃~25℃**
环境湿度 Humidity	**65±20%**

5. 电池性能 PERFORMANCE

5.1 测试条件 TEST CONDITIONS

以下测试条件针对新电池适用（出货后一个月内），充电前电池应在测试条件下先用 0.2I_tA 恒流放电至终止电压为 1.0V/cell，测试条件如下：

The test is carried out with new batteries (within one month after delivery) . Before it is charged, the battery should be discharged at 0.2I_tA to an end of voltage of 1.0V/cell under test conditions：

温度 Temperature：**20℃±5℃**

湿度 Humidity：**45%~85%**

标准充电方法 Standard charge：**200mA (0.1ItA) × 16h**

标准放电方法 Standard discharge：**400mA (0.2ItA) to 1.0V/cell**

5.2 测试方法与标准 TEST METHOD & PERFORMANCE

测试项目 Test	单位 Unit	标准 Specification	条件 Conditions	备注 Remarks
容量 Capacity	**mAh**	**≥2000**	Standard charge /Standard discharge	Up to 3 cycles are allowed
开路电压 OCV	**V**	**≥1.25**	In 1 hour after standard charge	
0.2 I_tA	**min**	**≥300**	Standard charge Before discharge	End voltage **1.0V/cell**
0.5 I_tA	**min**	**≥108**	Standard charge Before discharge	End voltage **1.0V/cell**
过充 Over charge	**mAh**	**≥2000** No leakage No deformation	0.1 ItA charge48 h, and rest for 1-4h, then discharge at 0.2 ItA	Temp.: 20 ± 5℃
荷电保持 Charge retention	**mAh**	**≥** **1200(60%CN)**	标准充电后贮存**28d**，标准放电 Standard charge, Storage of 28 days, Standard discharge	Temp.: 20 ± 2℃

循环寿命 Cycle life	**次**	**≥300**	**IEC61951-2(7.4.1.1)** **GB/T 22084.1-2008**	参考备注 Refer to Note

备注 Note： **{IEC61951-2(7.4.1.1)}**

Prior to the test, discharge the batteries at 0.2I_tA to a final voltage of 1.0V/cell.

Cycle number	Charge	Standing charged condition	Discharge
1	0.1I_tA for 16h	None	0.25I_tA for 2h 20min [a]
2-48	0.25I_tA for 3h 10min	Note	0.25I_tA for 2h 20min [a]
49	0.25I_tA for 3h 10min	Note	0.25I_tA to 1.0V
50	0.1I_tA for 16h	1h to 4h	0.20I_tA to 1.0V [b]
a. If the cell voltage drops below 1.0V, the discharge may be discontinued. b. It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50, so as to start cycle 51 at a convenient time. A similar procedure may be adopted at cycles 100, 150, 250, 300, 350, 400 and 450.			

循环 **1~50** 次循环，直至任一个第 **50** 次循环的放电时间少于 3h 为止。这时，按照第 **50** 次循环的规定再进行一次循环 。Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3h. At this stage, a repeat capacity measurement as specified for cycle 50 shall be carried out.

当连续两个这样的第**50**次循环的放电时间都少于**3h**时，寿命试验终止。试验结束时，获得的电池总的循环次数应不少于**500**次 。The endurance test is considered complete when two such successive capacity cycles give a discharge duration of less than 3 h. The total number of cycles obtained when the test is completed shall be not less than 500.

5.3 贮存 Storage

试验之前， 电池在环境温度**20℃±5℃**以恒流**0.2ItA**放电至终止电压**1.0V/cell**，然后以**0.1ItA**恒流充电**16h**。电池在平均温度**20℃±5℃**和相对湿度**65%±20%**的条件下开路贮存**12**个月。贮存期间，任何时侯环境温度都不应该超出**20℃±10℃**的范围。

贮存期满后，电池在环境温度**20℃±5℃**下以恒流**0.2ItA**放电至终止电压**1.0V/cell**，然后以**0.1ItA**恒流充电**16h**，以**0.2ItA**进行放电试验允许进行**5**次循环，当放电时间不少于**240min**时，试验结束。

Prior to this test, the cell shall be discharge, at a constant current of 0.2 ItA, to a final voltage of 1.0V. The cell shall then be stored on open circuit for 12 months.

After completion of the storage period, the cell shall be discharged at a constant current of 0.2 ItA to a final voltage of 1.0V. Five cycles are permitted for this test, the capacity for1ItA constant current shall be not less than 80%CN.

5.4 振动测试 Vibration

在振幅为**4mm(0.158in)**，频率为每分钟**1000**周期的条件下对电池进行震动测试，电池性能保持正常。

The battery shall not cause damage to its performances when tested with the amplitude at 4mm (0.158 inch) and the frequency at 1000Hz.

5.5 跌落测试

由**450mm(17.716in)**的高度自由跌落至橡木板上，电池的电性能应保持正常。

The battery shall not cause damage to its performances when dropped to the wooden board at a height of 450mm(17.716 inch).

5.6 安全性能 Safety

5.6.1 过放 Over-discharge device operation

外接电阻，使得电池过放电24h(外接电阻(mΩ)=1.2V×n×1000/2ItA)，电池不漏液不变形。

Discharged for 24hrs with an load resistor (Load(m Ω)=1.2V × n × 1000/2ItA), but no leakage nor deformation.

5.6.2 安全阀 Safety valve performance

电池**0.2ItA**放电至**0V**，然后增大放电电流至**1.0ItA**，并保持**1h**。电池不破裂、不爆炸，允许漏液、变形。

Test method: the batteries are discharged to 0V at 0.2ITA, then increase the current to 1ItA and maintain an hour, leakage and deformation are allowed, but no disrupt and no burst.

5.6.3 短路 Short circuit

电池**0.2ItA**充电**6.5h**，然后将正负极直接短路**1.0h**。电池不破裂、不爆炸，允许漏液、变形。

Test method: charge at 0.4ItA for 3.5hrs, short-circuit directly between positive pole and negative pole for 1.0h, no disrupt, no burst, but leakage and deformation are allowed.

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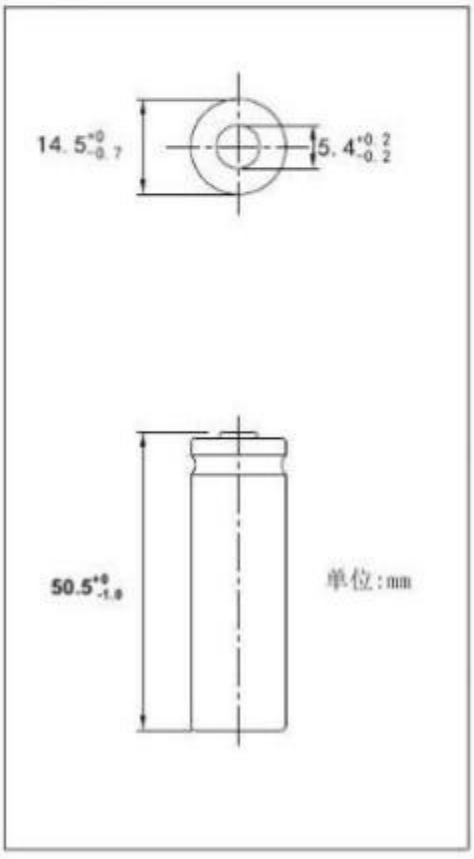
6. 单体电池尺寸充放电曲线 (Specifications of single cell ，characteristic of charge/discharge)

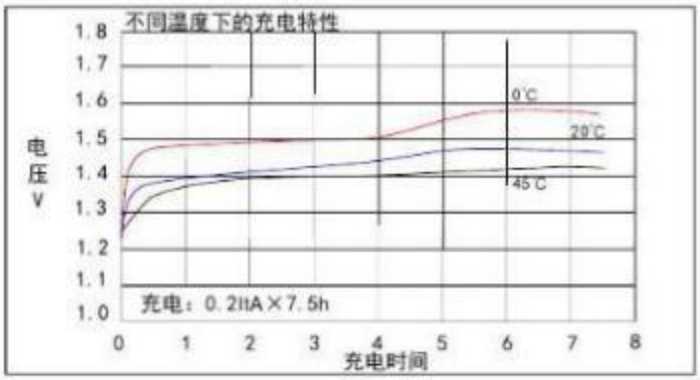
规格：MH-AAJ2000mAh-BTL

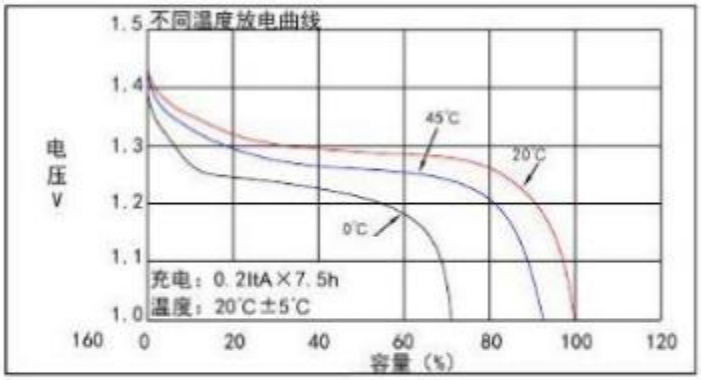
标称电压		1.2V	
容量 min	倍率	0.2C5Ah[1]	0.5C5Ah[2]
	最低	2000	1960
直径		$14.5^{+0}_{-0.7}$mm	
高度		$50.5^{+0}_{-1.0}$mm	
重量		約30g	
充电	标准	0.1ItA	
	快速	0.5ItA	
	涓流 最大	0.05ItA	
	涓流 最小	0.03ItA	
环境温度	充电 标准[3]	-10℃~40℃	
	充电 快速[4]	10℃~30℃	
	放电[5]	-10℃~55℃	
	储存	10℃~25℃	

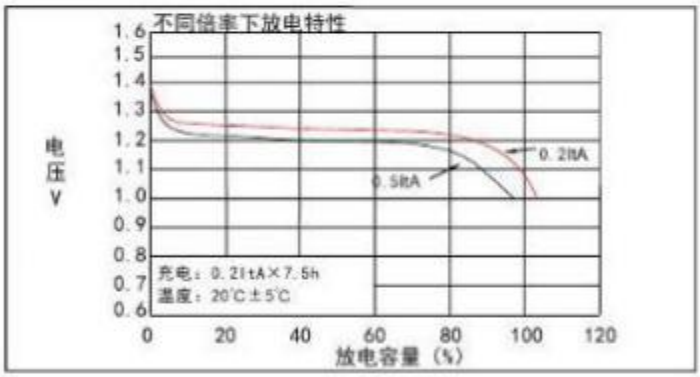
外形尺寸

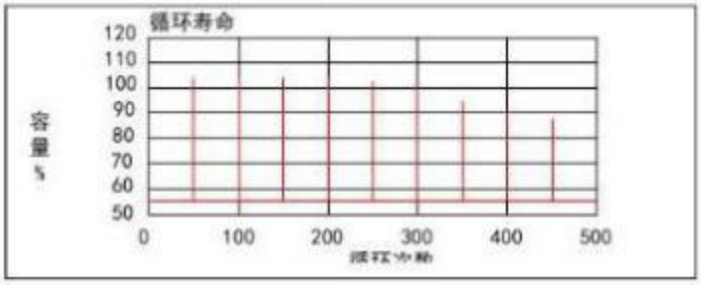


特征曲线









7. 使用和维护

7.1 电池可以采用恒流、恒功率的方式充电，充电电流及充电控制设计参照**5**的规定，在开始充电**5min**内不要用**－ ΔV**控制；不建议采用恒压充电方式的充电器。

Battery can be charged at constant current and constant power, charge current and charge control design can refer to the provisions of 5, don't control the battery with – Δ V for first 5 min at the beginning of charge; and not advice charge the battery with constant voltage charger.

7.2 过热或过冷都会减少电池容量和寿命。应尽量将电池温度保持在**15℃~25℃**之间。

Too hot or too cool will reduce the capacity and life of the battery, please keep the battery at 15℃ ~25℃ as much as posible.

7.3 电池放电电流及放电终止电压设定参照**5**的规定，不建议设定高于5规定的电流为工作电流。

Please refer to the provision of 5 to design discharge current and cut-off voltage, not advice to set discharge current more than the provision of 5.

7.4 以高于**5**规定的电流充/放电或组合数量大于**15**只时，请和我们联系。

Please contact with us when your charge/ discharge current is higher than the provision of 5 or the combination quantity more than 15 pieces.

7.5 短路、过充、过放、反极充电、新旧电池混用、高温及焚烧、撞击及跌落、充电方法不当时都会造成电池电性能降低，严重时电池会出现漏液、变形甚至爆炸。

Short circuit, over-charge, over-discharge, reverse charge, mix using new battery with semi-used battery, excessive temperature or incinerate, strike or drop, incorrect charge method all can cause battery drop performance, seriously can cause battery to leakage, deform or explode.

7.6 电池在阴凉干燥处保存； 电池带电贮存； 电池贮存后会降低电性能直至失效； 自购买电池之日起**6**个月内质保电池电性能。电池每贮存**3**个月，需进行维护；维护方法按**5**的规定进行充放电循环三次。

Please store the battery in a cool and dry place; Charge battery before store it; long time storage can drop battery performance until lose effectiveness; The period of guaranteeing of our battery is 3 months after the day of purchase; please maintain the storing battery every 3 months; please charge/discharge the battery 3 times according to the provision of 5.

7.7 电池可以充电、放电几百次，但最终会失效。当电池工作时间明显缩短时，请购买新电池。

Battery can charge and discharge several hundreds times, but can lose effectiveness at last. When battery's work hours shortened obviously, please buy new battery.

8. 建议和忠告 SUGGESTION & ADVICE

8.1 电池出现杂音、高温或漏液时，应停止使用。

If find any noise, excessive temperature or leakage from a battery, please stop its use.

8.2电池不用时，应与用电器分开。

When not using the battery, please disconnect it from the device.

8.3 不要将电池放入水中或火中。

Don't put the battery into water or fire.

8.4 远离儿童放置，一旦被儿童吞食，应立即看医生。

Keep away from children. If swallowed, contact a physician at once.