



松柏電池廠有限公司
松柏(廣東)電池工業有限公司
CHUNG PAK BATTERY WORKS LTD
CHUNG PAK (GUANG DONG) BATTERY INDUSTRIAL CO LTD

Model No:H250AA

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A. 摘要 Basic

| 產品類型 Type | 可充電鎳氫電池 Sealed Rechargeable Ni-MH | |
|---|--------------------------------------|------------------------------------|
| 產品名稱 Model | H250AA | |
| 參考型號 Size | AA | |
| 標稱電壓 Nominal Voltage (V) | 1.2 | |
| 標稱容量 Nominal Capacity (mAh) | 2500 | |
| 尺寸 Dimension | 直徑 Diameter (mm) | 14.5 ⁺⁰ _{-0.7} |
| | 高度 Height (mm) | 50.0 ^{+0.5} |
| 標準充電 Standard Charging | 電流 Current (mA) | 250 |
| | 時間 Time (h) | 16 |
| 適用溫度 Operation Temperature(°C) | 標準充電 Standard Charging | 0~45 |
| | 快速充電 Rapid Charging | 10~40 |
| | 放電 Discharging | -20~65 |
| | 儲存 Storage | -20~35(RH≤85%) |
| 長期充電電流 Permanent Charging Current (mA) | 75~125 | |
| 最大持續放電電流 Maximum Discharging Current (mA)(continuous) | 2500 | |
| 充電態內阻 Charge Impedance (mΩ) | ≤40 (1000Hz) | |
| 放電截止電壓 Discharge Cut-off Voltage (V) | 1.00 | |
| 荷電保持率 Charge Retention (20°C) | ≥60% | |
| 大約重量 Weight Approx. (g) | 32 | |

B. 測試及其方法 (Test Report)

測試必須在收到電池一個月內按下列方法進行：

Tests are carried out within one month of delivery under the following condition :

1. 環境條件 (Ambient Conditions) :

室內溫度： 20±5 °C

Room Temperature 20±5 °C

相對濕度： 65%±20%

Relative Humidity 65%±20%

2. 容量測試 Capacity Testing

2.1 標準充電 Standard Charging

0.2C 放電至 1.00V

0.2C discharge to 1.00V/cell

0.1C 充電 16 小時

0.1C charging for 16 hours

擱置 1 小時

Rest for 1 hours

0.2C 放電至 1.00V

0.2C discharge to 1.00V/cell.

在三個充放電循環後，放電容量不低於 2300mAh，典型值不低於 2380mAh。

Within 3 charge/discharge cycles, the minimum capacity is no less than 2300mAh, the typical capacity is no less than 2380mAh.



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3. 開路電壓 Open Circuit Voltage (OCV)

電池用 0.1C 充電 16h 後，擱置 1 小時，開路電壓 \geq 1.25V

After the battery is fully charged with 0.1C for 16h, within 1 hour, the OCV is greater than 1.25V/cell

4. 內阻 Internal Impedance

電池用 0.1C 充電 16h 後，擱置 1 小時，電池充電態內阻用 1000Hz 交流內阻儀測量，要求 \leq 40 m Ω 。

After the battery is fully charged with 0.1 for 16h, within 1 hour, the impedance is not greater than 40 m Ω , as tested by 1000Hz AC source.

5. 荷電保持率 Charge Retention

電池在 20 \pm 2 $^{\circ}$ C 環境溫度下 0.1C 充 16h 充滿電，擱置 28 天后，電池用 0.2C 直接放電至 1.00V，要求放電容量不低於 1500mAh。

The fully charged (with 0.1C for 16h) battery is held under temperature of 20 \pm 2 $^{\circ}$ C for 28 days, the discharged capacity is no less than 1500mAh.

6. 過充性能 Overcharging

在環境溫度 20 \pm 5 $^{\circ}$ C 下，電池用 0.2C 放電至 1.00V，然後 0.1C 充電 48 小時，要求電池不變形、無容量損失

Under temperature of 20 \pm 5 $^{\circ}$ C, After 0.2C to 1.00V, the battery is charged at 0.1C rate for 48 hours. No de-formation of the battery can be found. Standard capacity can be attained under normal discharging operation.

7. 循環壽命 Cycle Life

7.1 標準測試 (國際 IEC 標準) Normal Cycling Test:

| 循環工步號 Cycle No. | 充電 Charge | 擱置 Rest | 放電 Discharge |
|--------------------|----------------------------|------------|----------------------------|
| 1 | 0.1C \times 16hrs | None | 0.25C \times 2hrs 20mins |
| 2~48 | 0.25C \times 3hrs 10mins | None | 0.25C \times 2hrs 20mins |
| 49 | 0.25C \times 3hrs 10mins | None | 0.25C to 1.00V/cell |
| 50 | 0.1C \times 16hrs | 1~4hrs | 0.2C to 1.00V/cell |

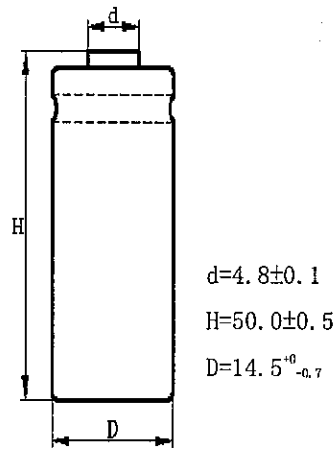
循環從工步 1 到工步 50 必須重複進行，直到工步 50 的放電容量低於 3 小時
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3hrs

經過以上 500 周充放電循環後，電池的 0.2C 放電容量應 \geq 1500mAh (60%)。

After 500 cycles of charging/discharging, capacity 1500mAh (60%) can be maintained under the cycling test.



C. 成品電池規格圖 (The Drawings of the Finished Battery)



單位:mm

圖 1. H250AA 的示意圖 (含套管)
Figure of H250AA cell (with tube)

注意: 以上所有數據的更改將不會提前通知。

Note: All the above values subject to change without prior notice.



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D. 破壞性測試 Abuse Test

| Items | Test conditions | Test results |
|---|---|--|
| 短路測試 Short circuit test | 0.2C 放電至 1.00V，0.1C 充 16 小時或 0.5C 充電 2.2 小時，然後用 50~100mΩ 銅線短路 1 小時或者更長時間。 After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours(or with 0.5C for 2.2hours), then shorted for 1hour or longer with a 50~100mΩ load or less | 要求電池不著火、不爆炸 No fire No explosion |
| 過充測試 Overcharge test | 0.2C 放電至 1.00V，0.1C 連續充電 48 小時 Cell is discharged with 0.2C to 1.00V, then 0.1C for 48 hours | 要求不爆炸，可能會出現洩氣和漏液 No explosion Leakage may occur |
| 過放測試 Over discharge test | 0.2C 放電至 0.00V，然後用 1C 強制放電 1 小時。 Cell is discharged with 0.2C to 0.00V, then with 1C forced discharged for 1hours | 要求不爆炸 No explosion |
| 跌落測試 Drop test | 0.2C 放電至 1.00V，0.1C 連續充電 16 小時，然後電池從 1.9 米高向下跌落在 10mm 厚的堅實木板上，按任意方向跌落 3 次 After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours, then cell is dropped 3 times from a 1.9m height onto solid wood (10mm thick) with random orientation | 要求電池不破裂，不漏液，不爆炸 No abruption No leakage No explosion |
| 振動測試 Vibration test | 電池持續振動 60 分鐘按以下頻率和振幅： 振幅：4mm 頻率：1000 次/分鐘 Cell is vibrated continuously lengthwise for 60minutes Amplitude: 4mm Frequency: 1000times/minutes | 無物理變化 不漏液 電池電性能無損失 No physical change No leakage Cell electrical performances unchanged |
| 高溫測試 High temperature test | 0.2C 放電至 1.00V，然後用 0.1C 充 16 小時或 0.5C 充電 2.2 小時後，放置在 150°C±5°C 的烘箱裏 After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours(or with 0.5C for 2.2hours), cell is placed to the baking oven which its set-up temperature is 150±5°C | 15 分鐘內 電池不爆炸 Cell don't explosion before 15 minutes |
| 穿透測試 (穿孔測試) Penetration test (Hole drilling) | 0.2C 放電至 1.00V，0.1C 充 16 小時或 0.5C 充電 2.2 小時，然後用直徑為 4mm 釘子對電池鑽孔，深度不小於 1mm。 After 0.2C to 1.00V, cell is fully charged with 0.1C for 16hours or 0.5C for 2.2hours, cell is drilled diameter wise with a 4mm Φ drill at a depth of less than 1mm | 要求不爆炸 No explosion |
| 水浸測試 Water immersion test | a、電池浸在水中一個月 b、電池浸在濃度為 5% 鹽水中一個月 a. Cell is immersed in water for one month b. Cell is immersed in salt water with a 5% concentration for one month | 要求不爆炸 No explosion |

注：破壞性測試均是採用單體電池測試。

Attention: The object of abuse test is unit cell.

警告：在進行以上破壞性測試前請諮詢松栢電池廠有限公司。

Warning: please consult Chung Pak Battery Works Ltd before performing those destructive tests.

本公司保留更改產品規格書任何資料的權力，且無須預先通知。

We reserve the right to alter or amend the specification without prior notice.



E. 充 / 放電特性 (Charge / Discharge Characteristics)

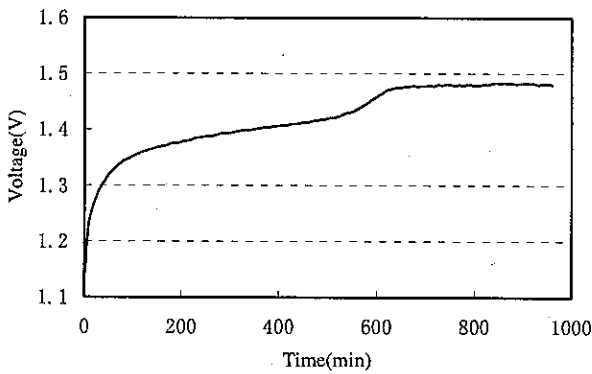


圖 2. 0.1C 充電曲線
(Fig2 0.1C Charging curve)

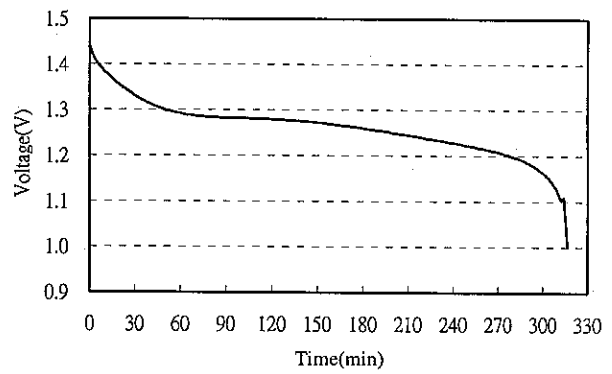


圖 3. 0.2C 放電曲線
(Fig3 0.2C discharging curve)

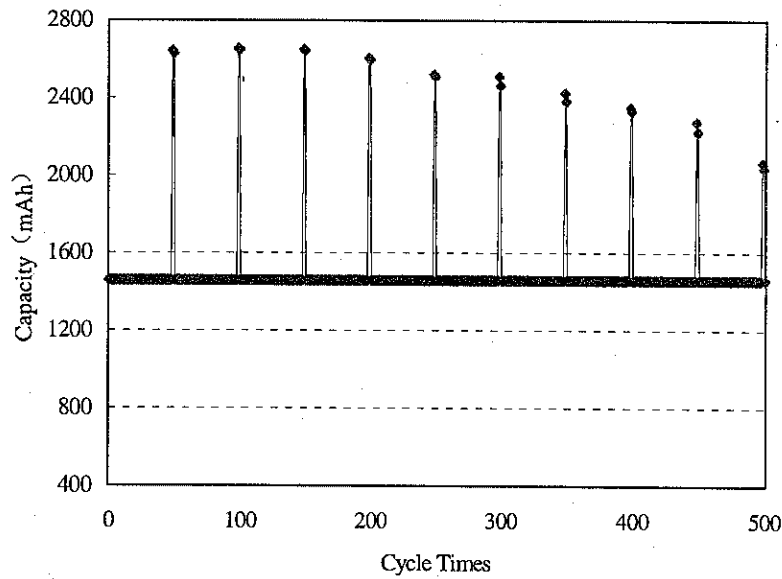


圖 4. 循環壽命 (國際 IEC 標準壽命測試)

Fig4. Cycle life curve (Normal cycling test)