



松栢電池廠有限公司  
 松栢(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: H210AA

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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		H210AA
參考型號 Size		AA
標稱電壓 Nominal Voltage (V)		1.2
標稱容量 Nominal Capacity (mAh)		2100
尺寸 Dimension	直徑 Diameter (mm)	14.5 <sup>+0</sup> <sub>-0.7</sub>
	高度 Height (mm)	50.0 <sup>+0.5</sup>
標準充電 Standard Charging	電流 Current (mA)	210
	時間 Time (h)	16
快速充電 Quick Charging	電流 Current (mA)	630
	時間 Time (h)	4
急速充電 Rapid Charging	電流 Current (mA)	1050
	時間 Time (h)	2.4
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)		63~105
最大持續放電電流 Maximum Discharging Current (mA)(continuous)		4200
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)		29

**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.

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在三個充放電循環後，放電容量不低於 2060mAh，典型值不低於 2100mAh。  
Within 3 charge/discharge cycles, the minimum capacity is no less than 2060mAh, the typical capacity is no less than 2100mAh.

## 2.2 快速充電 Quick Charging

0.2C 放電至 1.00V	0.2C discharge to 1.00V/cell
0.3C 充電 4 小時	0.3C charging for 4 hours
擱置 1 小時	Rest for 1 hours
0.2C 放電至 1.00V	0.2C discharge to 1.00V/cel

在三個充放電循環後，放電容量不低於 2015mAh，典型值不低於 2060mAh。  
Within 3 charge/discharge cycles, the minimum capacity is no less than 2015mAh, the typical capacity is no less than 2060mAh.

## 2.3 急速充電 Rapid Charging

0.5C 放電至 1.00V	0.5C discharge to 1.00V/cell.
0.5C 充電 144 分鐘， 加- $\Delta V=10\text{mV}$	0.5C charging for 144 minutes or - $\Delta V=10\text{mV/cell}$ .
擱置 1 小時	Rest for 1 hours
0.5C 放電至 1.00V	0.5C discharge to 1.00V/cell.

在三個充放電循環後，放電容量不低於 1890mAh。  
Within 3 charging/discharging cycles, the capacity is no less than 1890mAh.

## 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  $\geq 1.25\text{V}$   
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  $\leq 40\text{m}\Omega$ 。  
After the battery is fully charged with 0.1 for 16h, within 1 hour, the impedance is not greater than 40 m $\Omega$ , as tested by 1000Hz AC source.

## 5. 荷電保持率 Charge Retention

電池在  $20\pm 2^\circ\text{C}$  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 1260mAh。

The fully charged (with 0.1C for 16h) battery is held under temperature of  $20\pm 2^\circ\text{C}$  for 28 days, the discharged capacity is no less than 1260mAh.

## 6. 過充性能 Overcharging

在環境溫度  $20\pm 5^\circ\text{C}$  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  $20\pm 5^\circ\text{C}$ , 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 × 16hrs	None	0.25C × 2hrs 20mins
2~48	0.25C × 3hrs 10mins	None	0.25C × 2hrs 20mins
49	0.25C × 3hrs 10mins	None	0.25C to 1.00V/cell
50	0.1C × 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  $\geq$  1260mAh (60%).

After 500 cycles of charging/discharging, capacity 1260mAh (60%) can be maintained under the cycling test.

### 7.2 快速測試 (僅供參考) Fast cycling test (reference) :

0.5C 充電 132 分鐘，加- $\Delta V = 5mV$

Charging: 0.5C for 132 minutes, under  $-\Delta V$  control (5mV/cell)

擱置 30 分鐘

Rest: 30 minutes

0.5C 放電至 1.00V

Discharging: 0.5C to 1.00V/cell

經過以上 200 周充放電循環後，電池的 0.5C 放電容量應  $\geq$  1260mAh (60%).

After 200 cycles of charging and discharging, capacity 1260mAh (60%) can be maintained under the cycling test.

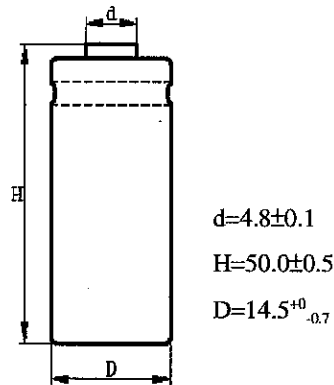


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**C. 成品電池規格圖 (The Drawings of the Finished Battery)**



單位:mm

圖 1. H210AA 的示意圖 (含套管)  
Figure of H210AA cell (with tube)

注意: 以上所有資料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 0.2C 放電至 1.00V, 0.5C 連續充電 5 小時 Cell is discharged with 0.2C to 1.00V, then 0.5C for 5 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 的烘箱裡 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.

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

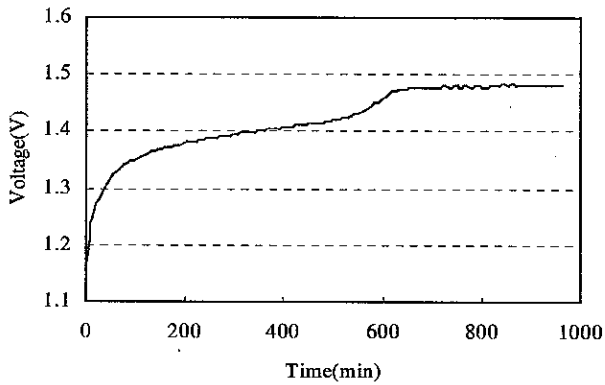


圖 2. 0.1C 充電曲線  
(Fig2 0.1C Charging curve)

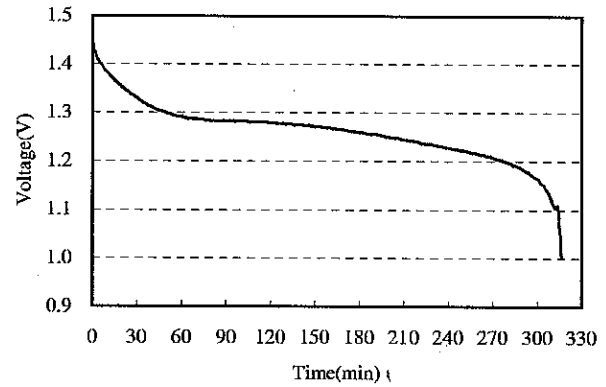


圖 3. 0.2C 放電曲線  
(Fig3 0.2C discharging curve)

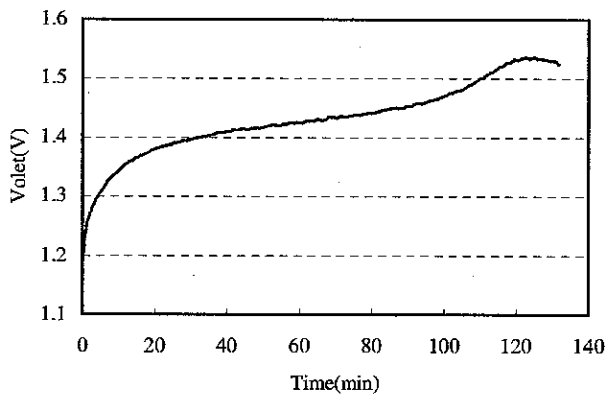


圖 4. 0.5C 充電曲線  
(Fig4 0.5C Charging curve)

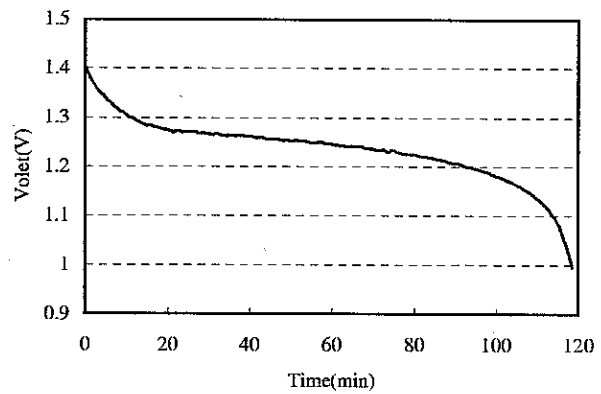


圖 5. 0.5C 放電曲線  
(Fig5 0.5C discharging curve)

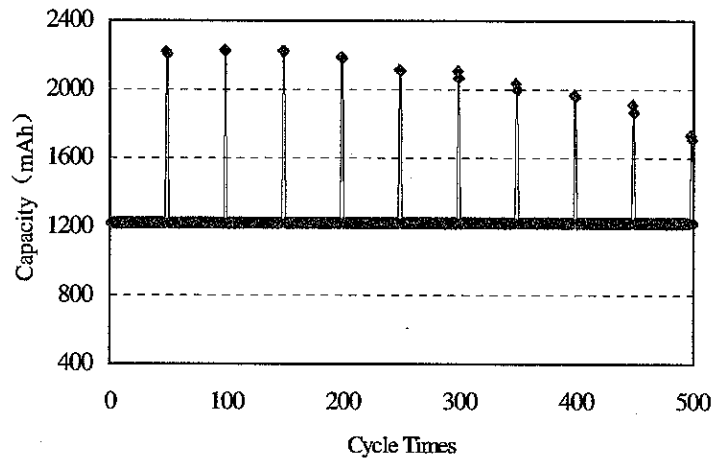


圖 6. 循環壽命 (國際 IEC 標準壽命測試)

Fig6. Cycle life curve (Normal cycling test)