

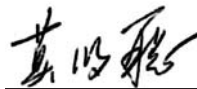
鈕型無汞鋅銀電池規格書  
**SPECIFICATIONS**  
**FOR SILVER OXIDE BUTTON CELL**

**377EF**

(0% Hg)

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## 鈕型無汞鋅銀電池 Silver Oxide Button Cell 377EF

### 1、範圍 Scope

該規格書適用於由松柏(廣東)電池工業有限公司提供之“Vinnic”商標鈕型無汞鋅銀 377EF 電池 (S8M-N)。

The specification is applicable to the “Vinnic” brand Silver Oxide Button Cell 377EF (Mercury free, S8M-N) supplied by CHUNG PAK BATTERY WORKS LTD.

### 2、產品類型 Kind of Products Specified

| Vinnic | IEC  | ANSI   | JIS  | 其他 Others   |
|--------|------|--------|------|-------------|
| 377EF  | SR66 | 1196SO | SR66 | SR626SW,SG4 |

### 3、規範性引用文件 Normative references

GB/T 8897.1-2021 原電池 第 1 部分：總則 (IEC 60086-1: 2015, MOD);

GB/T 8897.2-2021 原電池 第 2 部分：外形尺寸和電性能要求 (IEC 60086-2: 2015, MOD);

GB/T 8897.3-2021 原電池 第 3 部分：手表電池 (IEC 60086-3: 2016, MOD);

GB/T 8897.5-2013 原電池 第 5 部分：水溶液電解質電池的安全要求 (IEC 60086-5: 2011, IDT);  
符合法規(EU) 2023/1542。

IEC 60086-1 ED13 (2021) Primary batteries - Part 1: General

IEC 60086-2 ED14 (2021) Primary batteries - Part 2: Physical and electrical specifications

IEC 60086-3 ED5 (2021) Primary batteries - Part 3: Watch batteries

IEC 60086-5 ED5 (2021) Primary batteries- Part 5: Safety of batteries with aqueous electrolyte  
Conform to Regulation (EU) 2023/1542.

### 4、化學體系 Chemical System

鋅-氧化銀 (Zn/Ag<sub>2</sub>O/NaOH-電解液) Zinc-Silver Oxide (Zn/Ag<sub>2</sub>O/NaOH-Electrolyte)

### 5、技術規格 Technology Parameters

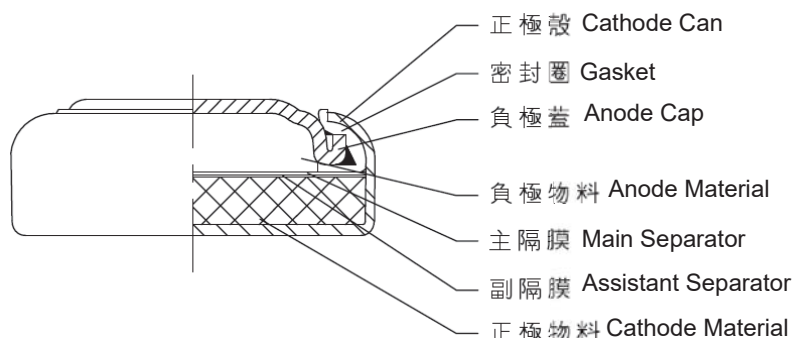
| No. | 項目 Item                                          | 特性 Characteristics |                                        | 備註 Remark                                                                                                           |
|-----|--------------------------------------------------|--------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 5.1 | 型號<br>Model No.                                  | 377EF              |                                        |                                                                                                                     |
| 5.2 | 標稱電壓<br>Nominal Voltage                          | 1.55V              |                                        |                                                                                                                     |
| 5.3 | 典型容量<br>Nominal capacity<br>(20±2℃)              | 21.5 mAh           |                                        | 以 47KΩ 連續放電，終止電壓 1.2V，取 8pcs 電池的放電平均值<br>Discharge at 47KΩ to 1.2V. The average discharging time of 8pcs batteries. |
| 5.4 | 放電時間<br>Typical Discharge<br>Duration<br>(20±2℃) | 680 hrs            |                                        | 以 47KΩ 連續放電，終止電壓 1.2V，取 8pcs 電池的放電平均值<br>Discharge at 47KΩ to 1.2V. The average discharging time of 8pcs batteries. |
| 5.5 | 外形尺寸<br>Dimension                                | 總高<br>Height (H)   | 2.60 <sup>+0</sup> <sub>-0.20</sub> mm |                                                                                                                     |
|     |                                                  | 直徑<br>Diameter (Φ) | 6.80 <sup>+0</sup> <sub>-0.20</sub> mm |                                                                                                                     |

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(續上表 Continuous)

|     |                               |                   |         |                                                                                                                               |
|-----|-------------------------------|-------------------|---------|-------------------------------------------------------------------------------------------------------------------------------|
| 5.6 | 平均重量<br>Average weight        | 0.38g             |         |                                                                                                                               |
| 5.7 | 使用溫度<br>Operating Temperature | 0℃~40℃            |         |                                                                                                                               |
| 5.8 | 貯存條件<br>Storage Condition     | 溫度<br>Temperature | 10℃~25℃ | 貯存溫度不應當超過 30℃<br>Storage temperature should never exceed 30℃.                                                                 |
|     |                               | 濕度<br>Humidity    | 55±20%  | 避免長時間處於極端濕度(相對濕度高於 95%或低於 40%)下<br>Extremes of humidity (over 95% RH and below 40% RH) for sustained periods should be avoid. |

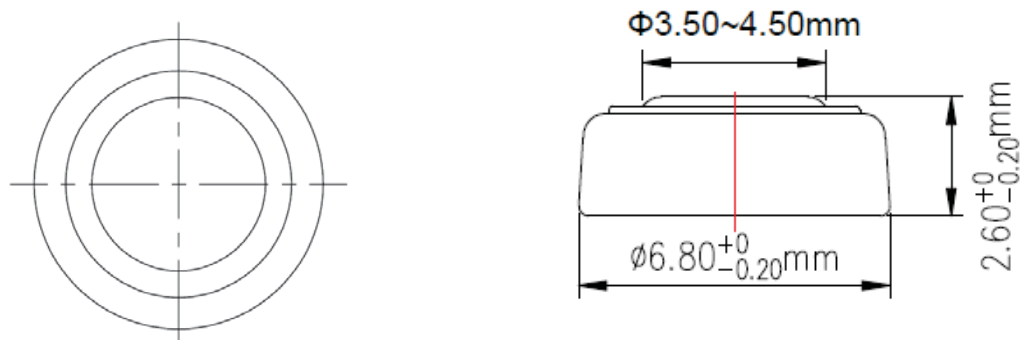
### 5.9 成品電池結構圖 The Drawing of The Finished Battery:



注：以上電池結構圖配件形狀與實物會有偏差，僅供參考使用。

Remark: There is deviation between part shape of "The Finished Battery Drawing" and actual product. The Drawing of Finished Battery is for reference only.

### 5.10 外形尺寸與端子 Outside Shape Dimensions and Terminals:



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### 6、特性 Performance

#### 6.1 空載電壓 Open-circuit Voltage:

|                                      |               |
|--------------------------------------|---------------|
| 初制成 Initial                          | 1.57 – 1.63 V |
| 貯存 12 個月後<br>After 12 Months Storage | 1.55 – 1.63 V |

注：在樣品測試開始之前，用電壓表進行測量。

Remark: Before the samples testing, measure with a voltmeter.

#### 6.2 放電壽命 Service Out-put:

|                                                               |                    |
|---------------------------------------------------------------|--------------------|
| 負載電壓<br>Load Resistance                                       | 47KΩ               |
| 放電方法<br>Discharge Method                                      | 連續放電<br>Continuous |
| 終止電壓<br>End-point Voltage                                     | 1.2 V              |
| 最小放電時數<br>Minimum Duration<br>(初制成 Initial)                   | 620 Hrs            |
| 最小放電時數<br>Minimum Duration<br>(12 個月 After 12 Months Storage) | 560 Hrs            |

注：“初制成”是指生產後三個月或三個月以內的產品。

Remark: The word “initial” is applicable to the products elapsed three months or less after production.

#### 6.3 高溫抗漏液性能 Resistance to leakage proof of High Temperature:

沒有變形和內部液體漏出現象。

No deformation and no external electrolyte leakage shall be observed.

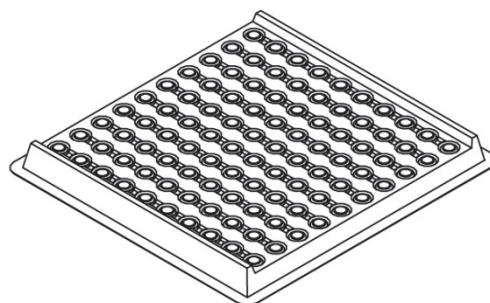
#### 6.4 保存期：1 年。(溫度 $20\pm 2^{\circ}\text{C}$ ，相對濕度 $55\pm 20\%$ )

Storage life: 1 year. (Temperature:  $20\pm 2^{\circ}\text{C}$ ，Relative Humidity  $55\pm 20\%$ )

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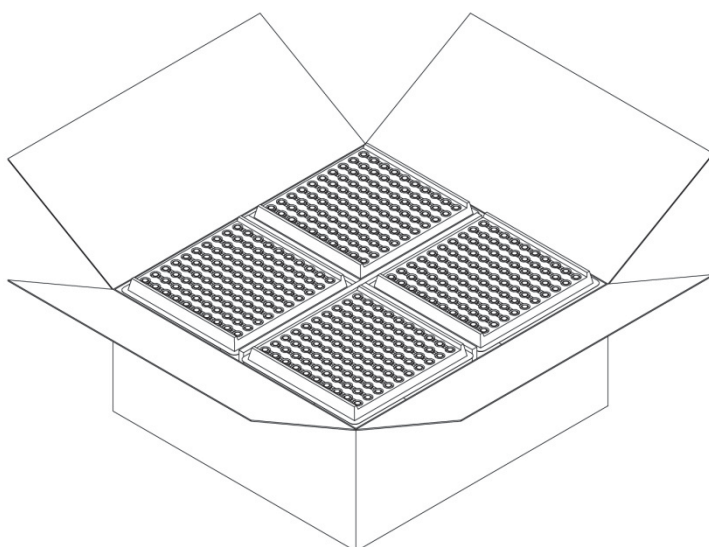
### 7、商標與包裝 Brand and packaging

#### 7.1 標準與包裝附圖 Standard and Packaging:



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100 pcs/白磁托(Per Display Pallet)  
白磁托尺寸(White Insulating Pallet  
Measure): 130X123.5X11 mm



16000 pcs/外箱(Display Carton)  
外箱尺寸(Carton Measure):  
270X260X129 mm

#### 7.2 可按客戶之要求特別安排。

Any specific design and packing requirements will be accommodated as required.

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### 8、安全指導 Safety instructions

#### ！ 使用注意事項 Caution

- 電池重疊 Overlapping Batteries

當電池雜亂地重疊或混合在一起時，它們的正極和負極會相互接觸，導致短路。

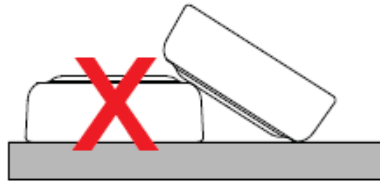
When batteries are overlapped or mixed together in a disorder way, their positive and negative terminals touch each other, causing short circuits.



- 電池放在金屬容器或金屬板上 Batteries put in a Metallic Container or on a Metallic Plate

與電池重疊問題類似，當電池置於金屬容器或金屬板上時，其正極和負極端子可能會因放置位置不同而通過導電表面短路。

Similar to the overlapping battery problem, when batteries are put in a metallic container or on a metallic plate, their positive and negative terminals may short circuit through the conductive surface depending on the placement.



金屬板 Metallic Plate

- 当电池用镊子夹住时 When a Battery is Held with Tweezers

当用一对如下图所示的金属镊子夹住时，电池会通过镊子短路。

When held with a pair of metallic tweezers as shown below, the battery short-circuits through the tweezers.



金屬鑷子 Metallic Tweezers

- 接觸電池端子應使用鍍鎳鐵或鍍鎳不銹鋼。

Use Nickel-plated iron or Nickel-plated stainless steel for the terminals that contact the battery.

- 確保端子接觸壓力最小為 50g，以獲得穩定的接觸。

Make sure that terminal contact pressure is 50g minimum, for a stable contact.

- 保持電池和接觸端子表面清潔，無水分和異物。

Keep the battery and contact terminal surfaces clean and free from moisture and foreign matter.

- 插入電池前，檢查電池接觸端子是否正常，是否彎曲或損壞。(彎曲的端子可能與電池接觸不良或導致短路。)

Before inserting the battery, check the battery contact terminals to make sure they are normal, not bent or damaged. (Bent terminals may not make good contact with the battery or may cause short circuit.)

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- 應按電池及電器具上標明的極性標誌(+和-)正確地裝入電池。

Always insert batteries correctly with regard to the polarities (+ and -) marked on the battery and the equipment.



- 請勿將端子與導電金屬、物品接觸。把電池放在不導電的托盤裡。

Do not contact terminals with conductive i.e. metal, goods. Keep batteries in non-conductive, i.e. plastic, trays.



- 當電池雜亂堆放時，可能會產生短路、發熱、甚至引起爆炸。

When the batteries are piled up in a disorderly way, their positive and negative terminals may short-circuit, consuming some batteries while charging others, causing explosion.

- 請勿混合使用不同型號和品牌的電池，或新舊電池。電池組應該用相同電壓、容量和內阻的單個電池組裝。更換電池時，要用相同牌號，相同類型的新電池，同時換掉所有的電池。

Do not mix batteries of types and brands, or new and used batteries. We are well informed that battery pack should be assembled with single batteries of similar voltage, capacity and inner resistance.

Battery characteristics vary with type and grade, even when batteries are the same size and shape.

When replacing batteries with new ones, be sure to carefully check the symbols and numbers on them.



- 使用高阻抗(1M 或更高)電壓表測量電池電壓。

Use a high impedance (1M or higher) voltmeter to measure battery voltage.

- 電池艙尺寸應合適，不宜過松或過緊，避免振動時對電池絕緣層、絕緣件造成破壞。

Reduce impact to insulation layer from vibration, but the dimension will enlarge.

- 避免過大電流對電池放電使用，可能會出現谷脹、漏液或爆蓋(建議最好不要用小於 500Ω 電阻連續放電)。

Battery should not discharge with large current. The battery may appear bulge, leakage or explosion by large current discharge or use (It is recommended that not less than 500Ω impedance which given in the specification.)

- 應及時從用電器中取出已耗盡電能的電池並妥善處理。放過電的電池長時間留在電器中有可能發生電解液泄漏、谷脹或爆蓋，導致用電器損壞和/或人身傷害。

(建議電池單粒終止下限電壓不能低於 0.6V，最好用電器有下限電壓保護。)

Exhausted batteries should be immediately removed from equipment and properly disposed of. When discharged batteries are kept in the equipment for a long time, electrolyte leakage, bulged or explosion may occur causing damage to the appliance and/or personal injury.

(It is recommended that the end voltage should not lower than 0.6V. And low limit voltage protection of equipment is required.)

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### ！危險 Danger

- 電池應放在兒童拿不到的地方。吞食會導致化學灼傷，軟組織穿孔和死亡。萬一誤吞，應立即就醫。

Keep batteries out of the reach of children. Swallowing coin cells or batteries can cause chemical burns, perforation of soft tissue, and in severe cases can cause death. They need to be removed immediately if swallowed.



- 無成人監督時請勿讓兒童更換電池。

Do NOT allow children to replace batteries without adult supervision.

- 請勿對電池充電。試圖對不可充電的原電池充電會使電池內部產生氣體和熱量，導致泄放、泄漏、爆炸和人身傷害。

Do NOT charge batteries. Attempting to charge a non-rechargeable (primary) battery may cause internal gas and/or heat generation resulting in venting, leakage, explosion and personal injury.



- 請勿拆卸電池。拆卸電池時與電池內的部件接觸是有害的，可能會導致人身傷害或著火。

Do NOT dismantle batteries. When a battery is dismantled or taken apart, contact with the components can be harmful and may cause personal injury or possibly fire.



- 請勿破壞電池。不要對電池擠壓、打孔或進行其他形式的破壞，可能導致泄放、泄漏、爆炸及人身傷害。

Do NOT deform batteries. Batteries should not be crushed, punctured, or otherwise mutilated. Such abuse may result in venting, leakage and explosion and cause personal injury.



- 請勿用火處理電池。用火處理電池時，所產生的熱量可導致電池爆炸和人身傷害。不要焚燒電池，除非被允許在可以控制的爐子進行處理。

Do NOT dispose of batteries in fire. When batteries are disposed of in fire, the heat build-up may cause explosion personal injury. Do Not incinerate batteries except for approved disposal in a controlled incinerator.



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- 不要過度放電電池。當電池與外部電源連接或與其他電池串聯時發生過放電，可能發生爆炸。  
DO NOT over-discharge the battery. In case the battery is over-discharged when connected with exterior power source or connected with other batteries in series, explosion may occur.
- 當儲存或扔掉電池時，一定要用膠帶把它蓋上。如果電池與其他金屬物體接觸，可能會引起火災或損壞。  
When storing a battery or throwing it away, be sure to cover it with tape. If the battery is contacted with other metal objects, it could cause fire or become damaged.

### ！警告 Warning

- 使用前請仔細閱讀使用說明書，不正確的操作可能导致泄漏、发热、冒烟、爆炸或火灾，造成设备故障或损伤。  
Thoroughly read the user's manual before use, inaccurate handling may cause leakage, heat, smoke, explosion, or fire, causing device trouble or injury.
- 按電池及用電器標明的極性標誌(+和-)正確裝入電池。  
Insert the battery with the “+” and “-” ends correctly oriented.
- 不要將新舊電池或不同類型或牌號的電池混用。  
If the battery is used together with new batteries, do not use it with a different type battery.
- 不要直接焊接電池。  
Do not solder the battery directly. Protect the welding point and connector.
- 電池最好存放在乾燥和涼爽的環境中。避免將電池存放在陽光直射的地方，或過熱潮濕的地方。為了保證電池的使用壽命，必須避免高溫儲存。  
The battery should be preferably stored in dry and cool conditions. Avoid storing the battery in direct sunlight, or in excessively hot and humid place. Storage at high temperature must be avoided to preserve the battery life time.

### ！存放 Storage

- 電池最適宜儲存於乾燥和涼爽的環境中。正常的貯存溫度應在 10℃~25℃之間，不應當超過 30℃。相對濕度應在 55±20%。應避免長時間處於極端濕度(相對濕度高於 95%或低於 40%)下。高溫或高濕可能會損害電池性能或造成電池表面腐蝕，對電池和包裝都有害。  
The cell should be preferably stored in dry and cool conditions. For normal storage, the temperature should be between 10℃ and 25℃, and should never exceed 30℃. The relative humidity should be 55±20%. Extremes of humidity (over 95%RH and below 40%RH) for sustained periods should be avoided. High temperature or high humidity may cause deterioration of the battery performance or surface corrosion, and detrimental to both batteries and packaging.

## 鈕型無汞鋅銀電池 Silver Oxide Button Cell 377EF

### 附錄 1 : 測試

### Appendix 1: Test

#### 1. 樣品貯存和測試條件 Storage and test conditions for samples

如果沒有規定，一般地，樣品貯存條件為：溫度  $20\pm 2^{\circ}\text{C}$ ，濕度  $55\pm 20\%$ 。

樣品測試條件為：溫度  $20\pm 2^{\circ}\text{C}$ ，濕度  $55+20/-40\%\text{RH}$ 。

Unless otherwise specified, the storage conditions for, samples shall be, as a general rule at the temperature of  $20\pm 2^{\circ}\text{C}$  and the relative humidity of  $55\pm 20\%$ .

And the test conditions is temperature of  $20\pm 2^{\circ}\text{C}$  and the relative humidity of  $55+20/-40\%\text{RH}$ .

#### 2. 測量儀表和設備 Measuring instruments and devices

2.1 電壓表：測量電壓的儀器準確度應不低於 0.25%，精密度應不低於最後一位有效數值的 50%，內阻應不小於  $1\text{M}\Omega$ 。

Voltmeter : The accuracy of the measuring equipment shall be  $\leq 0.25\%$  and the precision shall be  $\leq 50\%$  of the value of the last significant digit. The internal resistance of the measuring instrument shall be  $\geq 1\text{M}\Omega$ .

2.2 負載電阻：負載電阻包括所有外電路，其容許誤差為 $\pm 0.5\%$ 以內。

Load resistance : The load resistance shall include all of the external circuit, and its allowance shall be within  $\pm 0.5\%$ .

2.3 游標卡尺：游標卡尺應具有 0.02mm 或更高的精確度。

Caliper : The caliper shall be the one having precision of 0.02 millimeters or the one having the same or superior precision to this.

#### 3. 測試方法 Test method

3.1 規格尺寸：用游標卡尺進行測量。

Dimensions: Measurements shall be made by use of the calipers.

3.2 外形：目視。

Appearance: Examination shall be carried out by visual inspection .

3.3 空載電壓：在樣品放電開始之前，用電壓表測量。

Open-circuit Voltage: Measurements shall be carried out before the start of discharge of the sample by use of the voltmeter .

3.4 放電壽命 Service Out-put

放電開始時間：置于  $20\pm 2^{\circ}\text{C}$  溫度條件下不少於 8 小時後再開始放電。

Discharge Start time: After leaving in an atmosphere at a temperature of  $20\pm 2^{\circ}\text{C}$  for at least 8 hours or more .

放電方法：按第 3 頁之 6.2 條。

Discharge Method: As defined in 6.2 , page 3 .

放電終止：閉路電壓已降到放電終止電壓(規定於第 3 頁之 6.2 條中)以下的一瞬間。

Discharge End-point: The instant when the closed-circuit voltage has reached below the end-point voltage(as defined in 6.2, page 3).

## 鈕型無汞鋅銀電池 Silver Oxide Button Cell 377EF

### 附錄 2：放電特性曲線圖

#### Appendix 2 : Discharge Characteristics

標準放電曲線 Standard Discharge Curve:

