

SPECIFICATIONS
FOR SILVER OXIDE BUTTON CELL

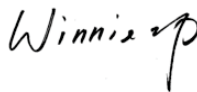
357F
(Mercury Free)

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Date : APR 2020

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Silver Oxide Button Cell 357F

1 · Scope

The specification is applicable to the “Vinnic” brand Silver Oxide Button Cell 357F (Mercury free) supplied by CHUNG PAK BATTERY WORKS LTD.

2 · Kind of Products Specified

Vinnic	IEC	ANSI	JIS	Others
357F	SR44	1131SO	/	SR44W, SG13

3 · Normative references

GB/T 8897.1-2013 Primary batteries –Part 1: General (IEC 60086-1:2015, MOD);

GB/T 8897.2-2013 Primary batteries –Part 2: Physical and electrical specifications (IEC 60086-2:2015, MOD);

GB/T 8897.3-2013 Primary batteries –Part 3: Watch batteries (IEC 60086-3:2016, MOD);

GB/T 8897.5-2013 Primary batteries –Part 5: Safety of batteries with aqueous electrolyte (IEC 60086-5:2011, IDT);

Conform to Directive 2006/66/EC.

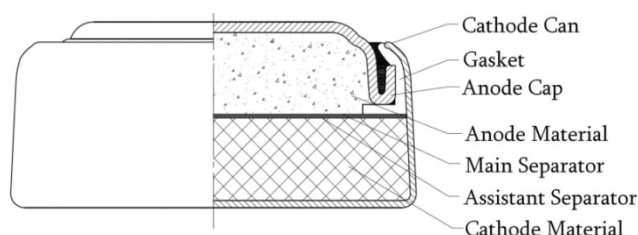
4 · Chemical System

Zinc-Manganese Dioxide (Potassium Hydroxide Electrolyte)

5 · Technical Specification

No.	Item	Characteristics		Remark
5.1	Model No.	357F		
5.2	Nominal Voltage	1.55V		
5.3	Nominal capacity (20±2℃)	133 mAh		Discharge at 1KΩ to 0.9V. The average discharging time of 9pcs batteries.
5.4	Typical Discharge Duration (20±2℃)	100 hrs		Discharge at 1KΩ to 0.9V. The average discharging time of 9pcs batteries.
		540 hrs		Discharge at 6.8KΩ to 1.2V. The average discharging time of 9pcs batteries.
5.5	Dimension	Height (H)	5.40 ⁺⁰ _{-0.40} mm	
		Diameter (Φ)	11.60 ⁺⁰ _{-0.25} mm	
5.6	Average weight	1.94g		
5.7	Usage Temperature	0℃～40℃		
5.8	Storage Temperature	20±5℃		

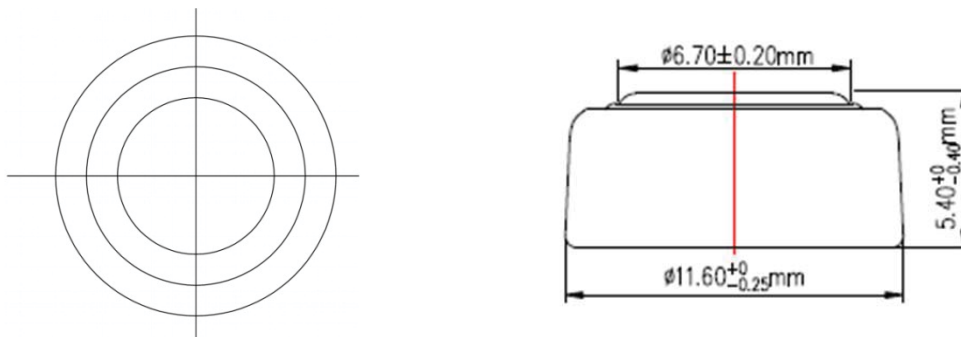
5.9 The Drawing of Finished Battery :



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

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5.10 Outside Shape Dimensions and Terminals :



6 Performance

6.1 Open-circuit Voltage :

Initial	1.55 – 1.63 V
After 12 Months Storage	1.55 – 1.63 V

6.2 Service Out-put :

Load Resistance	1K Ω	6.8K Ω
Discharge Method	Continuously	Continuously
End-point Voltage	0.9V	1.2V
Minimum Duration (Initial)	95 Hrs	486 Hrs
Minimum Duration (After 12 Months Storage)	86 Hrs	440 Hrs

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

6.3 High Temperature Electrolyte Leakage Resistance :

No deformation and no external electrolyte leakage shall be observed.

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

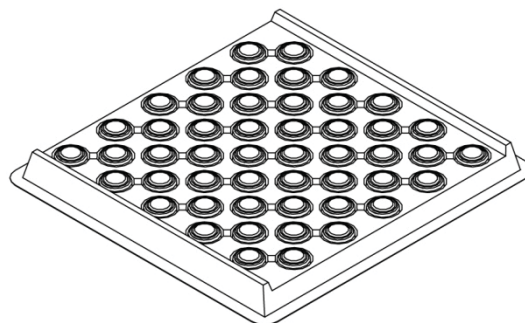
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7 、Brand and packaging

7.1 Appendix 1: Standard and Packaging

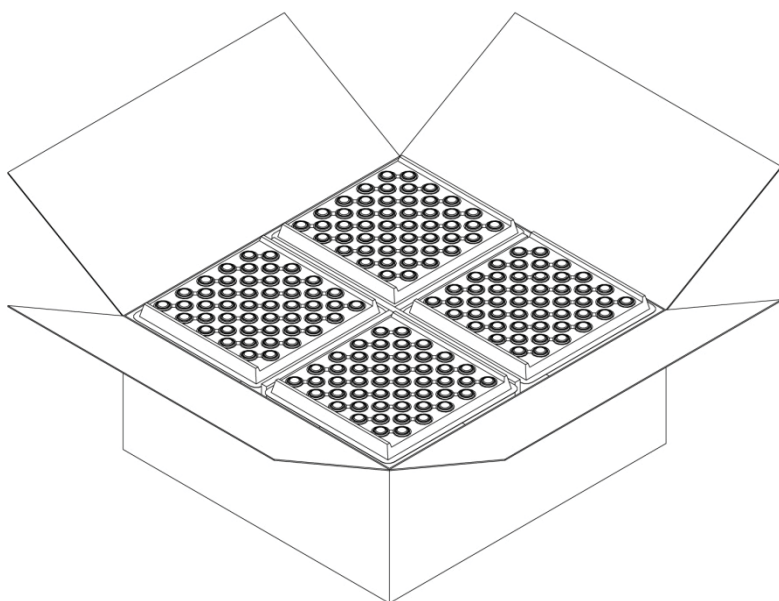


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50PCS Per Display Pallet

White Insulating Pallet Measure : 130X123.5X11 mm



4000 PCS Per Display Carton

Carton Measure : 270X260X129 mm

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

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8 · Safety instructions

! Caution

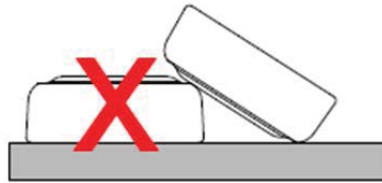
- Overlapping Batteries

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



- Batteries put in a Metallic Container or on a Metallic Plate

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.



Metallic Plate

- When a Battery is Held with Tweezers

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



Metallic Tweezers

- Use Nickel-plated iron or Nickel-plated stainless steel for the terminals that contact the battery.
- Make sure that terminal contact pressure is 50g minimum, for a stable contact.
- Keep the battery and contact terminal surfaces clean and free from moisture and foreign matter.
- 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.)
- 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.
- 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.
- Use a high impedance (1M or higher) voltmeter to measure battery voltage.
- Do not contact terminals with conductive i.e. metal, goods. Keep batteries in non-conductive, i.e. plastic, trays.
- Reduce impact to insulation layer from vibration, but the dimension will enlarge.
- 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.

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! Danger

- 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.



- Do NOT allow children to replace batteries without adult supervision.
- DO NOT recharge, short-circuit, disassemble, deform, heat or place the battery near a direct flame. This battery contains flammable materials such as lithium and organic solvent and performing any of the above actions could cause it to ignite explode or become damaged.
- 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.
- Keep this battery out of the reach of children. If it is swallowed, contact a physician immediately.
- 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.

! Warning

- Thoroughly read the user's manual before use, inaccurate handling may cause leakage, heat, smoke, explosion, or fire, causing device trouble or injury.
- Insert the battery with the "+" and "-" ends correctly oriented.
- If the battery is used together with new batteries, do not use it with a different type battery.
- Do not solder the battery directly. Protect the welding point and connector.
- 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.

! Storage

- The cell should be preferably stored in dry and cool conditions.

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Appendix 1 : Test

1. Storage and Test Conditions for Samples

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 humidity of $55\pm 20\%$.

2. Measuring Instruments

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

2.3 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. Test Method

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

3.2 Appearance : Examination shall be carried out by visual inspection .

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

3.4 Service Out-put :

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 .

Discharge Method : As defined in 4.2 , page 2 .

Discharge End-point : The instant when the closed-circuit voltage has reached below
the end-point voltage(as defined in 4.2, page 2).

3.5 High Temperature Electrolyte Leakage Resistance

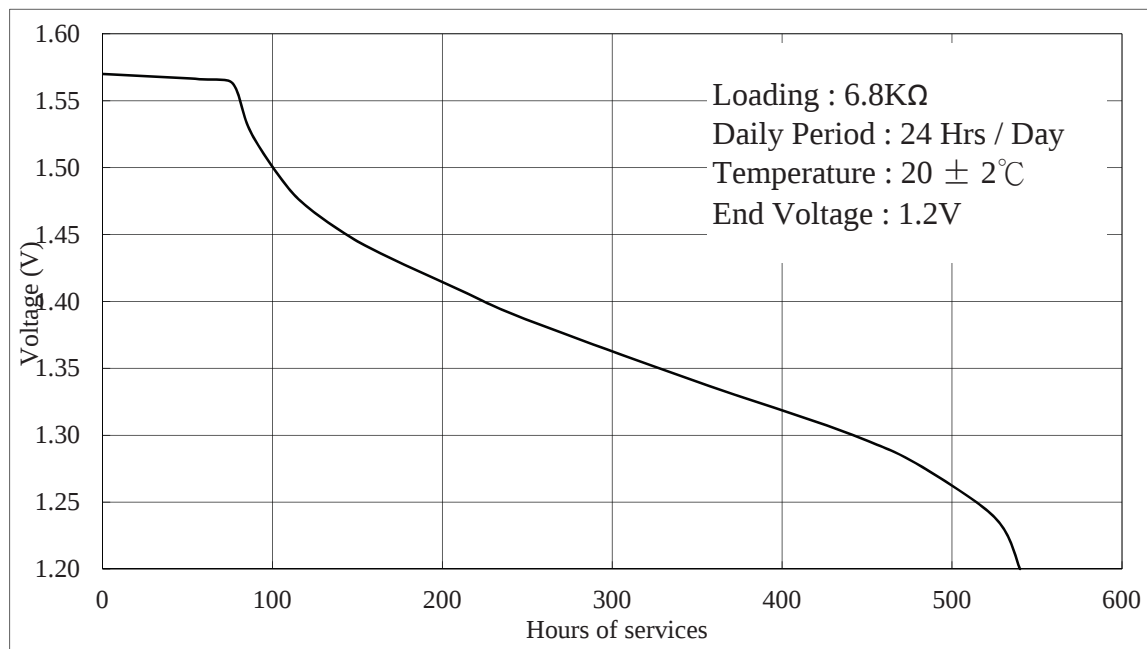
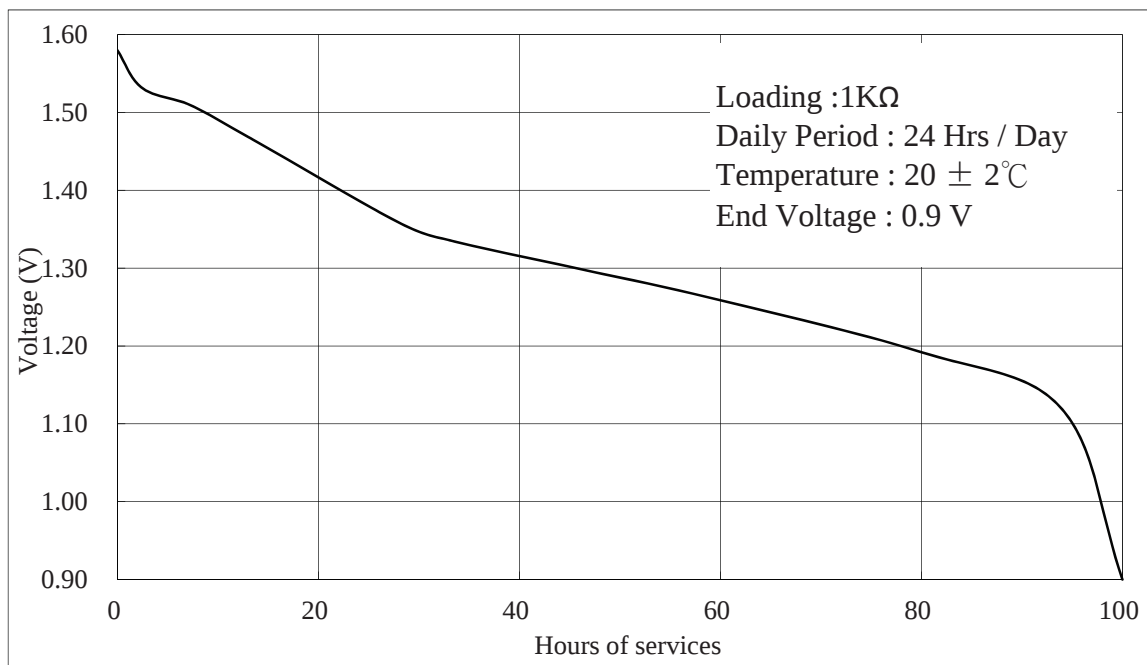
The following conditions shall be adopted for the test :

- (1) Test temperature and humidity : $45\pm 2^{\circ}\text{C}$, below 70%RH .
- (2) Test period : Leave to stand still 30 days .

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Appendix 2 : Discharge Characteristics

Standard Discharge Curve :



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Temperature Characteristic :

