

鹼錳干電池規格書
SPECIFICATIONS
FOR ALKALINE MANGANESE DRY BATTERY

AM4/LR03

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鹼錳干電池 Alkaline Manganese Dry Battery AM4/LR03

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”—“銀戰士”商標無汞鹼錳干電池。

This specification is applicable to the“Vinnic” brand Alkaline Manganese Mercury Free Dry Batteries supplied by **CHUNG PAK BATTERY WORKS, LTD.**

2、產品類型 Kind of Products Specified

Vinnic	IEC	ANSI	JIS	其他 Others
AM4/LR03	LR03	24A, 24AC	LR03	AAA, E92, MN2400

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 60086-1:2021, MOD);

GB/T 8897.2-2021 原電池 第2部分：外形尺寸和電性能要求 (IEC 60086-2:2021, 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 60086-5:2016, IDT);
符合法規(EU) 2023/1542。

GB/T 8897.1-2021 Primary batteries –Part 1: General (IEC 60086-1:2021, MOD);

GB/T 8897.2-2021 Primary batteries –Part 2: Physical and electrical specifications (IEC 60086-2:2021, MOD);

GB/T 8897.5-2013 Primary batteries –Part 5: Safety of batteries with aqueous electrolyte (IEC 60086-5:2016, IDT);
Conform to Regulation (EU) 2023/1542.

4、化學體系 Chemical System

鋅-二氧化錳 Zinc-Manganese Dioxide

5. 技術參數 Technology Parameters

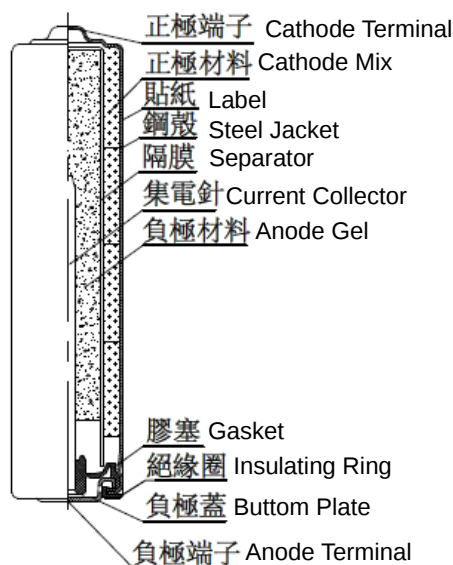
No.	項目 Item	特性 Characteristics	備註 Remark
5.1	型號 Model No.	AM4/LR03	
5.2	額定電壓 Nominal Voltage	1.5V	
5.3	典型容量 Nominal capacity (20±2℃)	1250 mAh	以 75Ω 放電,每天 4 小時, 終止電壓 0.9V, 取 8pcs 電池的放電平均值 Discharge at 75Ω 4h/day, E.V.0.9V (The average discharging time of 8pcs batteries)
5.4	放電時間 Typical Discharge Duration (20±2℃)	260 min	以 5.1Ω 放電,每天 1 小時, 終止電壓 0.8V, 取 8pcs 電池的放電平均值 Discharge at 5.1Ω 1h/day, E.V.0.8V (The average discharging time of 9pcs batteries)
		19 hrs	以 50mA 放電, 放電 1 小時, 停 11 小時, 一天 24 小時, 終止電壓 0.9V, 取 8pcs 電池的放電平均值 Discharge at 50mA 1h on, 11h off for 24h per day, E.V.0.9V (The average discharging time of 8pcs batteries)

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(續上表 Continuous)

5.5	保存能力 Retention	93%		(於 20℃ 條件下存放 12 個月) After 12 months storage (20℃)
		88%		(於 20℃ 條件下存放 24 個月) After 24 months storage (20℃)
		85%		(於 20℃ 條件下存放 36 個月) After 36 months storage (20℃)
		80%		(於 20℃ 條件下存放 60 個月) After 60 months storage (20℃)
5.6	規格尺寸 Dimension	直徑 Diameter (Ø)	10.5mm	
		高度 Height (H)	44.5mm	
5.7	重量(大約) Weight (approx)	11.4g		
5.8	使用溫度 Operating Temperature	0℃～40℃		
5.9	貯存條件 Storage Condition	溫度 Temperature	10℃～25℃	貯存溫度不應當超過 30℃ Storage temperature should never exceed 30℃.
		濕度 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 Extremes of humidity (over 95% RH and below 40% RH) for sustained periods should be avoid.

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



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5.11 外形尺寸與端子 Outside shape dimensions and terminals:

鹼錳干電池規格尺寸

LR03

Technical drawing of an LR03 alkaline manganese dry battery. The drawing shows a cylindrical battery with a positive terminal on top and a negative terminal on the bottom. Dimensions are labeled: d1 (battery diameter), d3 (positive terminal diameter), h1 (overall height), h2 (distance between contact flats), h3 (positive terminal projection), h4 (negative terminal recess), and d6 (negative terminal outer diameter).

Unit:mm

	Max	Min
h1	44.5	
h2		43.5
h3		0.8
h4		0
d1	10.5	9.8
d3	3.8	
d6		4.3

註 Remarks:

h1: 電池總高 The overall height of the battery

h2: 正、负极接触面之间的距离 The distance between the flats of the positive and negative contacts

h3: 正极接触面凸起值 Projection of the flat positive contact

h4: 负极接触面的凹进值 Recess of the negative flat contact surface

d1: 電池直徑 Diameter of battery

d3: 在规定的凸起高度内，正极接触面直径 Diameter of the positive contact within the specified projection height

d6: 负极接触面的外徑 Outer diameter of the negative flat contact surface

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6. 特性 Performance

(所有測試方法見附錄 1 For all test method, refer to Appendix 1)

6.1 空載電壓 Open-circuit voltage:

初制成/ Initial	1.600 ~ 1.720V
貯存 12 個月後 After 12 months storage	1.540 ~ 1.680V
貯存 24 個月後 After 24 months storage	1.520 ~ 1.650V
貯存 36 個月後 After 36 months storage	1.510 ~ 1.630V
貯存 60 個月後 After 60 months storage	1.500 ~ 1.600V

6.2 放電壽命 Service out-put:

參考要求 Reference Requirement	放電條件 Discharge Condition			最小平均放電時數 Average Minimum duration	
	負載 Load	放電方法 Discharge method	終止電壓(V) End point Voltage(V)	初制成 Initial	存放 12 個月后 After 12 months storage
REF	3.9Ω	24h/day	0.90 V	145 min	130 min
IEC	5.1Ω	1h/day	0.80 V	260 min	230 min
IEC	5.1Ω	4min/h, 8h/day	0.90 V	235 min	210 min
IEC	24Ω	15s/min, 8h/day	1.00 V	19.0 hrs	17.6 hrs
IEC	50mA	1h/12h, 24h/day	0.90 V	19.0 hrs	17.6 hrs
ANSI	250mA	5min/h, 12h/day	1.10 V	2 hrs	1.8 hrs

“初制成”是指生產後一個月或一個月以內的產品，包括那些生產後已開始放電尚不到三個月的電池。
The word“initial”is applicable to the products elapsed one month or less after production , including those , to which tests have been started in less than three month after production.

符合性標準 Satisfaction Standard:

- 每批放電標準用 8 個電池作測試;
8 piece of battery will be tested for each discharging standard;
- 每個放電標準下的平均放電時間的結果等於或者大於平均最小放電時間要求;不多於一個電池的電性能輸出低於規格要求的 80%;
The result of the average discharging time from each discharging standard shall be equal to or more than the average minimum time requirement;and no more than one battery has a service output less than 80% of the specified requirement.
- 允許一次重新測試來確定先前的結果。
One re-test is allowed to confirm the previous result.

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6.3 過放抗漏液 Overdischarge electrolyte leakage resistance:

沒有變形和外部液体漏出。

No deformation and no external electrolyte leakage shall be observed.

6.4 高溫抗漏液 High temperature electrolyte leakage resistance:

沒有變形和外部液体漏出。

No deformation and no external electrolyte leakage shall be observed.

6.5 保存期：5 年。(溫度 $20\pm 2^{\circ}\text{C}$ ，相對濕度 $55\pm 20\%$)

Storage life: 5 years. (Temperature: $20\pm 2^{\circ}\text{C}$ ，Relative Humidity $55\pm 20\%$)

6.6 安全測試 Safety Test

6.6.1 指定使用的檢驗項目及要求(見表 1)

Intended use tests and requirements (appendx : 1)

檢驗項目 Test		所模擬的指定使用 Intended use simulation	要求 Requirements
電性能檢驗 Electrical test	A	電池部分使用(部分放電)后貯存 Storage after partial use	不泄漏 No leakage (NL) 不爆炸 No explosion (NE)
環境檢驗 Environmental Tests	B-1	運輸-沖擊 Transportation shock	不泄漏 No leakage (NL) 不爆炸 No explosion (NE)
	B-2	運輸-振動 Transportation vibration	不泄漏 No leakage (NL) 不爆炸 No explosion (NE)
氣候-溫度環境 Climatic-temperature	C	氣溫-溫度循環 Climatic-temperature cycling	不爆炸 No explosion (NE)

6.6.2 可預見誤用的檢驗和要求

Reasonably foreseeable misuse tests and requirements

檢驗項目 Test		所模擬的誤用 Misuse simulation	要求 Requirements
電性能檢驗 Electrical tests	D	不正確的安裝 Incorrect installation	不爆炸 No explosion (NE)
	E	外部短路 External short circuit	不爆炸 No explosion (NE)
	F	過放電 Overdischarge	不爆炸 No explosion (NE)
環境檢驗 Environmental test	G	自由跌落 Free fall	不爆炸 No explosion (NE)

所有 6.6 測試均參照 IEC 60086-5 和 GB 8897.5。

All of test (6.6) are meet IEC 60086-5 & GB 8897.5.

7. 重金屬含量 Content of heavy metals

電池中重金屬物質含量如下：

The following material content of heavy metals in the batteries:

Hg	Cd	Pb
<0.0001%	<0.001%	<0.004%

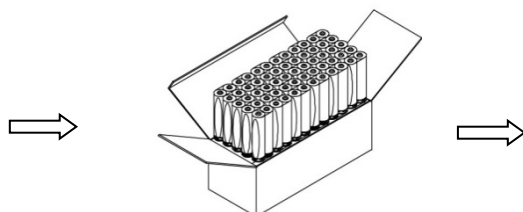
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8. 商標與包裝/ Brand and packaging

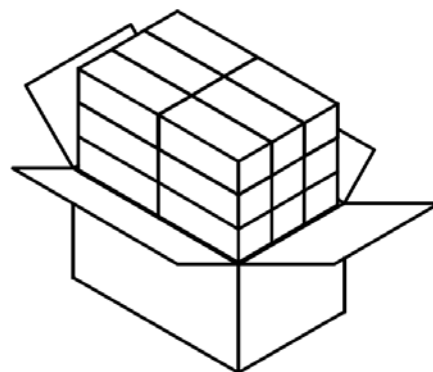
8.1 標準與包裝附圖/ Standard and packaging



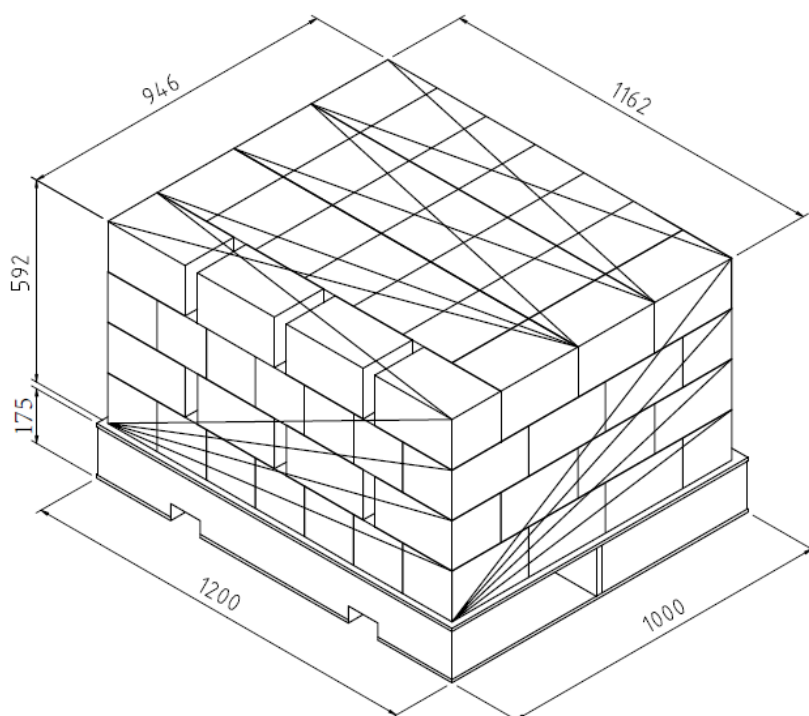
AM4/LR03 2 粒裝
AM4/LR03 – SP2



60 粒/彩盒(Display Boxes)
彩盒尺寸(Boxes Measure):
126X52X46 mm



1080 粒/外箱(Display Carton)
外箱尺寸(Carton Measure):
260X166X148 mm



貨物尺寸 Goods Dimension:

貨物高度 Height: 592 mm

貨物長度 Length: 1162 mm

貨物寬度 Width: 946 mm

木制的卡板 Wooden Pallet:

卡板高度 Pallet Height: 175 mm

卡板尺寸 Pallet Measure: 1200X1000mm

重量 Weight:

卡板重量 Pallet Weight: 22kgs

淨重 Net Weight: 1256 kgs

毛重 Gross Weight: 1292 kgs

數量 Quantity :

1 層=25 箱

1 Layer = 25 Cartons

4 層 X25 箱=100 箱/卡板

4 Layer X 25 Cartons=100 Cartons / Pallet

8.2 可按客戶之要求特別安排。

Both OEM and ODM orders are welcome. Any specific design and packaging requirements will be accommodated as required.

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9、安全指導 Safety instructions

！ 使用注意事項 Caution

- 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.



- 接觸電池端子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.)

- 當電池的正極(+)和負極(-)直接連接時，電池就可能被短路，從而有可能導致泄放、泄漏、爆炸和人身傷害。

When the positive (+) and negative (-) terminals of a battery are in electrical contact with each other, the battery becomes short-circuited. This may result in venting, leakage, explosion and personal injury.



- 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 different 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。

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

- 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。

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

- 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.

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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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- 請勿加熱電池。電池被加熱后有可能發生泄放、泄漏和爆炸并導致人身傷害。
Do NOT heat batteries. When a battery is exposed to heat, venting, leakage and explosion may occur and cause personal injury.
- 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，不正確的操作可能導致泄漏、發熱、冒煙、爆炸或火災，造成設備故障或損傷。
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.

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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 $55\pm 20/-40\%\text{RH}$ 。

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 $55\pm 20/-40\%\text{RH}$.

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 0.05mm 或更高的精確度。

Caliper : The caliper shall be the one having precision of 0.05 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 外型：用目視法檢查

Appearance : Examination shall be carried out by visual inspection.

3.3 空載電壓：在樣品放電開始之前，用電壓表進行測量。

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 output

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

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.

放電溫度濕度： $20\pm 2^{\circ}\text{C}$, $55\pm 20/-40\%\text{RH}$ 。

Discharge temperature and humidity: $20\pm 2^{\circ}\text{C}$, $55\pm 20/-40\%\text{RH}$.

放電方法：按第 4 頁之 6.2 條，但是，在 7 天中要有 5 天以上進行放電，並且當放電為一天兩次時，兩次放電之間應相隔 4 小時。

Discharge method : As defined in 6.2. However discharge shall be effected for more than 5 days during 7 days and when discharge is made twice a day, an interval of 4 hours shall be elapsed between two discharges.

放電終止：閉路電壓已降到終止電壓(規定於第 4 頁之 6.2 條中)以下的那一瞬間。

Discharge end-point : The instant when the closed-circuit voltage has reached below the end-point voltage (as defined in 6.2, Page 4).

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3.5 過放抗漏液 Overdischarge electrolyte leakage resistance

按以下條件進行試驗

The following conditions shall be adopted for the test

- (a) 放電開始: 置於 $20\pm 2^{\circ}\text{C}$ 溫度條件下至少 8 小時之後

Discharge start point: After keeping at the temperature of $20\pm 2^{\circ}\text{C}$ for at least 8 hours or more

- (b) 試驗溫度及濕度 : $20\pm 2^{\circ}\text{C}$, $55\pm 20\%$ RH

Test temperature and humidity: $20\pm 2^{\circ}\text{C}$, $55\pm 20\%$ RH

- (c) 負載電阻 : $15\ \Omega$

Load resistance : $15\ \Omega$

- (d) 試驗方法: 連續放電 48 小時

Test method : Continuous discharge for 48 hours

3.6 高溫抗漏液 High temperature electrolyte leakage resistance

按以下條件進行試驗

The following conditions shall be adopted for the test

- (a) 試驗溫度及濕度: $45\pm 2^{\circ}\text{C}$, $55\pm 20\%$ RH

Test temperature and humidity: $45\pm 2^{\circ}\text{C}$, $55\pm 20\%$ RH

- (b) 試驗時間: 30 days

Test period : 30 days

- (c) 試驗方法: 靜止擺放

Test method : Leave to stand still.

附錄 2 : 放電特性

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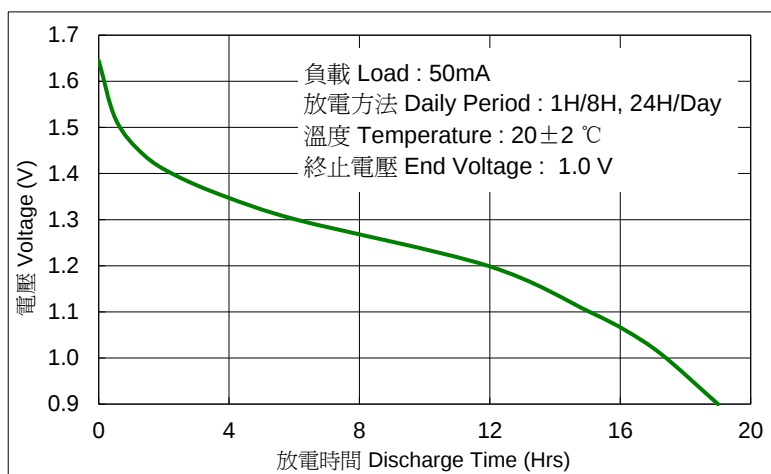
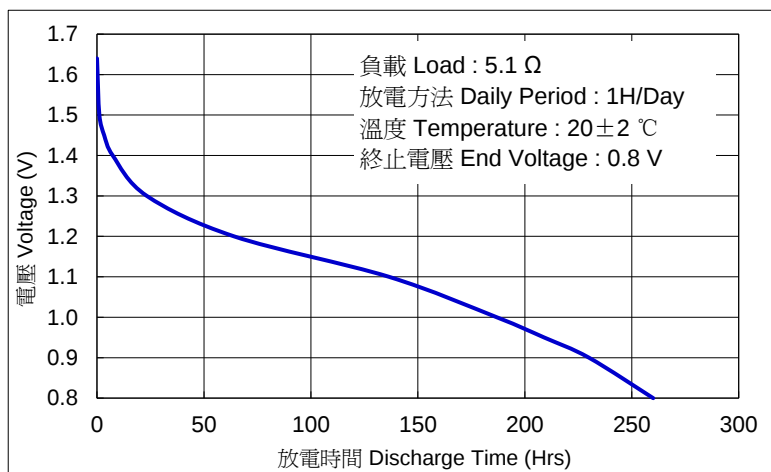
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Appendix 2: Discharge characteristics

標準放電曲線:

STANDARD DISCHARGE CURVE



溫度特性(以不同電阻連續放電):

TEMPERATURE CHARACTERISTICS:

(Discharge continuously at various resistance)

