TO： 宁波金山双鹿电池有限公司 殿

| | |
|---|---|
| T.T.SPEC 技術試作 | — |
| T.P.SPEC 工場試作 | — |
| M.P.SPEC 製作仕様 | ○ |

# 納 入 仕 様 書
# Spec. for delivery

貴社より提出して頂いた納入仕様書を受領いたしました。
The delivery specifications submitted from your company were accepted.

| | | | |
|---|---|---|---|
| 品名 | (Article Name) | : | BATTERY,PRIMARY(R03-MANGANESE) |
| 規定格 | (Rating) | : | PAIRDEER R03/7#/AAA |
| 物品識別番号 | (Part No) | : | 9901482007 |
| 取引先仕様書№ | (Specification No.) | : | JYO201 |

**株式会社ゼネラル**
GENERAL Inc.

受領（Receipt）
2026.02.26

所 属：
SECTION：
空調機部門 生産本部 開発購買部
Development Procurement Division
Production Unit,Air conditioner Business

| 部長 CHECK | 検図 CHECK | 担当 DESIGNED | |
|---|---|---|---|
| 生産本部 開発購買部 2026/02/26 マネージャー 河原 | 開発購買部 '26.02.26 山本（茂） | — | 開発購買部 2026/02/26 千田 |

技術認証グループ
Technical Certification Group

| 部長 CHECK |
|---|
| 技術認証Gr 2026.02.26 Gr.M 岡元 |

関連技術部門
Related engineering divisions

| | | | |
|---|---|---|---|
| — | — | — | — |

| 版 EDITION | 年 月 日 DATE | 部長 CHECK | 検図 CHECK | 担当 DESIGN | 担当 DESIGN | 改訂記事 REVISED DESCRIPTION |
|---|---|---|---|---|---|---|
| 04 | | | | | | |
| 03 | | | | | | |
| 02 | 2026.02.26 | 河原 | 山本 | — | 千田 | 取引先仕様書NO. 変更、鉛含有率の記載変更(≦0.0100%⇒≦0.0040%)、ラベル"Pb"マーク削除 |
| 初制 01 | 2025.11.25 | 河原 | 山本 | 千田 | 製品名・機種名 MODEL | ASTG09LVCC |

| | | | |
|---|---|---|---|
| 備考 REMARKS | 図面名 SORT OF DRAWING | 名称 TITLE 納入仕様書 Spec. for delivery | 版 EDITION 02 / サイズSIZE A4 |
| | 株式会社ゼネラル GENERAL Inc. | 図面番号 DRAWING NO. M19901482007 | ページ PAGE 1 / 1 |

Ver：1.2.3

# PRODUCT SPECIFICATION

## R03 / 7# / AAA BATTERY

Type Designation: PAIRDEER R03 / 7# / AAA

Manufacturer: Ningbo Fengyin Battery Co., Ltd.

Manufacturer's Address: No.339 ShiDai Road, Wuxiang Town,Yinzhou District, Ningbo, China

Prepared by: 崔张卉

Checked by:

Approved by: 张涛

Issued Date: 2026-2-25

## 1. Scope

This specification is applicable R03 Super Heavy Duty (PVC/Foil Jacket) Mercury-free,Cadmium-free, Lead-free battery.

## 2. Law & Regulation Compliances

| GB Standard | IEC Standard | EU Standard |
|---|---|---|
| GB/T 8897.1<br>GB/T 8897.2<br>GB 8897.5 | IEC 60086-1<br>IEC 60086-2<br>IEC 60086-5 | (EU) 2023/1542<br>(EU) 2025/40 |

## 3. General

3.1 Type designation

| IEC/JIS/GB | Common |
|---|---|
| R03 | 7# (China)<br>AAA (USA)<br>UM4 (Japan) |

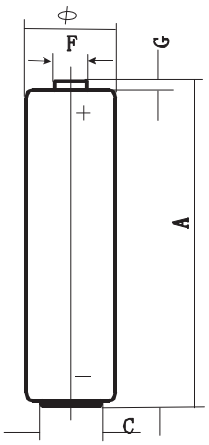
3.2 Chemical system: $Zn/ZnCl_2$-$NH_4Cl$-$H_2O/MnO_2$

3.3 Nominal voltage: 1.5V

3.4 Weight: approximate 6.9g

3.5 Dimension (mm)

| / | min | max |
|---|---|---|
| Φ | 9.8 | 10.5 |
| A | 43.5 | 44.5 |
| C | 4.3 | - |
| F | - | 3.8 |
| G | 0.8 | - |




3.6 Capacity: approximate 380mAh ( 75Ω, 4h/d , 20°C, e.v.= 0.9V )

3.7 Operation temperature: -18°C ~+35°C, recommended temperature +10°C ~+25°C

3.8 Heavy metal contents: Hg≤0.0001%, Cd≤0.0020%, Pb≤0.0040%



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## 4. Appearance

The battery visually inspected by unaided eye 30cm away from battery. The battery shall be free from dents, scratch, rust and extruded internal compounds, such as sealing compounds and etc, and serious displacement of artwork. Appearance defects shall not be observed that may adversely affect actual use or performance of batteries.

## 5. Electrical Characteristics

Unless otherwise stated, all measurements are to be performed at a standard environment of
**20°C±2 °C**
**55 +20 / -40% RH.**

All samples are normalized for 8 hours at least at the above environment prior to measurement.
The digital voltmeter (DCM) is with the precision of 1mV (internal resistance not less than 1 Megohm).
The load resistance of the total circuit is accurate within ±0.5% of the specified value.

5.1 Open circuit voltage and closed circuit voltage (Load resistance 3.9Ω, 0.3S)

| / | | OCV (V) | CCV (V) |
|---|---|---|---|
| Initial | Min | 1.60 | 1.40 |

5.2 Service output

| Load | | 3.9Ω | 5.1Ω | 24Ω | 75Ω | 5.1Ω | 50mA |
|---|---|---|---|---|---|---|---|
| Test mode | | 24h/d | 4m/h 8h/d | 15s/m 8h/d | 4h/d | 1h/d | 1h/12h 24h/d |
| End voltage | | 0.9V | 0.9V | 1.0V | 0.9V | 0.8V | 0.9V |
| Unit | | m | m | h | h | m | h |
| Applications | | Reference | Portable lighting | Remote control | Radio | Toy | Digital audio |
| Initial | GB | / | 50 | 4 | 20 | 30 | 3 |
| | MAD | 36 | 78 | 7 | 24 | 75 | 7 |

s: second m: minute h: hour d: day

Remark: 1) The initial discharge test shall commence within 30 days of manufacture. During stored period, the batteries shall be stored under 20±2 °C, 55+20/-40%RH conditions.

2) MAD: minimum average duration--our guarantee discharge value.

3) Delayed discharge performance after 12 months is 80% of MAD.

## 6. Leakage Resistance

6.1 Over discharge leakage test
Test conditions: 20±2°C, 55+20/-40%RH, 3.9Ω continuous discharge to 0.6V.
Number of test samples: 8 batteries.
Requirement: no leakage, no explosion.



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## 7. Safety Characteristics

7.1 User Drop Test

This test simulates the situation when a battery is accidentally dropped.

Test conditions: undischarged test batteries shall be dropped from a height of 1m onto a concrete surface. Each test battery shall be dropped six times, twice in each of the three axes. The test batteries shall be stored for 1h afterwards.

Number of test samples: 5 batteries.

Requirement: no fire or explosion; leakage is allowable.

7.2 Short-circuit explosion-proof characteristics

This test simulates an external short circuit of a battery during daily handling of batteries.

Test conditions: positive and negative terminals of an undischarged battery shall be connected directly. The circuit shall be completed for 24h or until the battery case temperature has returned to ambient. The resistance of the inter-connecting circuitry shall not exceed 0,1Ω.

Number of test samples: 5 batteries.

Requirement: no fire or explosion; leakage is allowable.

## 8. Expiry Date

3 years

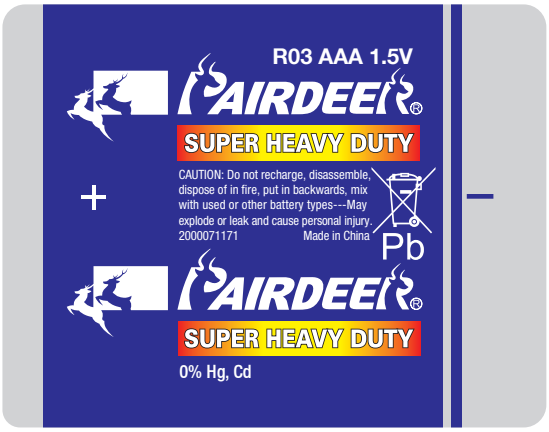
## 9. Expiry Date Marking

9.1 Unless otherwise specified, each battery will carry a expiry date code (YYYY-MM) for domestic and expiry date code (MM-YYYY) for export.

## 10. Packaging Requirements

10.1 The total of heavy metal lead, cadmium, mercury, and hexavalent chromium concentration shall not exceed 100ppm in packaging materials and printing inks. Ozone depleting substances (ODS) shall not be used in the manufacturing of any packaging.

10.2 The printing on each cell label is legible and permanent. Others can be resolved through negotiation based on the requirement of both parties.



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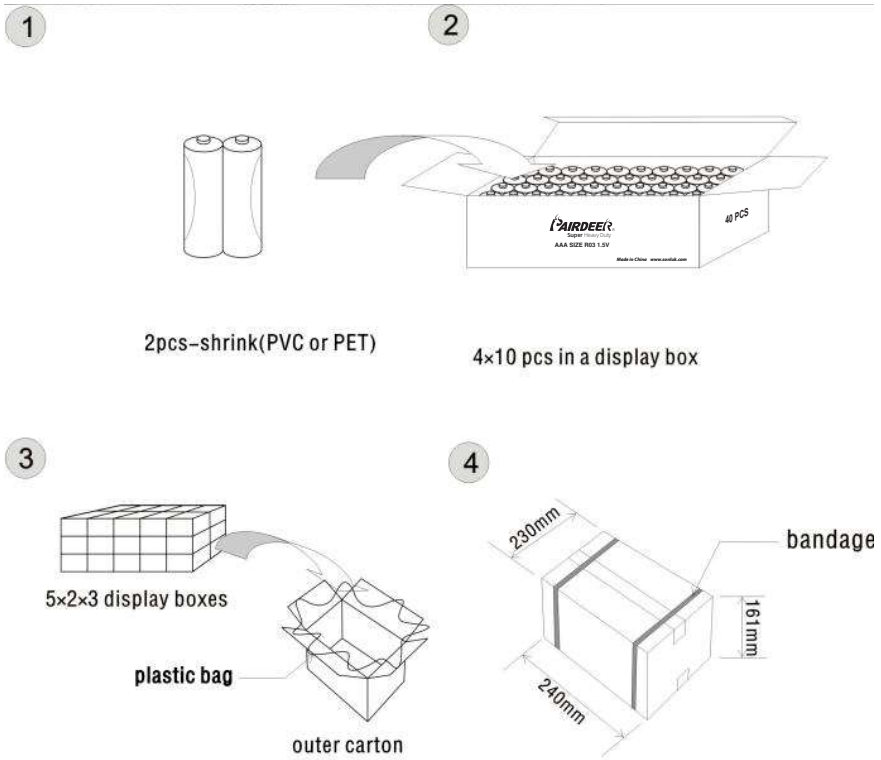
10.3 Packaging specification:




10.4 Otherwise packaging for shipment and sales shall conform to the mutually agreed to packaging specification of the designated customers.

## 11. Material Safety Data Sheet

| MATERIALS | APPROXIMATE PERCENT OF TOTAL WEIGHT (%) | CAS NO. | MATERIALS | APPROXIMATE PERCENT OF TOTAL WEIGHT (%) | CAS NO. |
|---|---|---|---|---|---|
| Manganese Dioxide ($MnO_2$) | ~28.1 | 1313-13-9 | Acetylene Black | ~5.1 | 1333-86-4 |
| Zinc (Zn) | ~30.4 | 7440-66-6 | Fe | ~2.34 | 7439-89-6 |
| Water ($H_2O$) | ~14.2 | 7732-18-5 | Ni-plating | ~0.06 | 7440-02-0 |
| Zinc Chloride ($ZnCl_2$) | ~7.0 | 7646-85-7 | Polyethylene (PE) | ~1.6 | 9002-88-4 |
| Ammonium Chloride ($NH_4Cl$) | ~1.0 | 12125-02-9 | Carbon | ~7.3 | / |
| Paper | ~1.7 | / | PVC | ~1.2 | 9002-86-2 |



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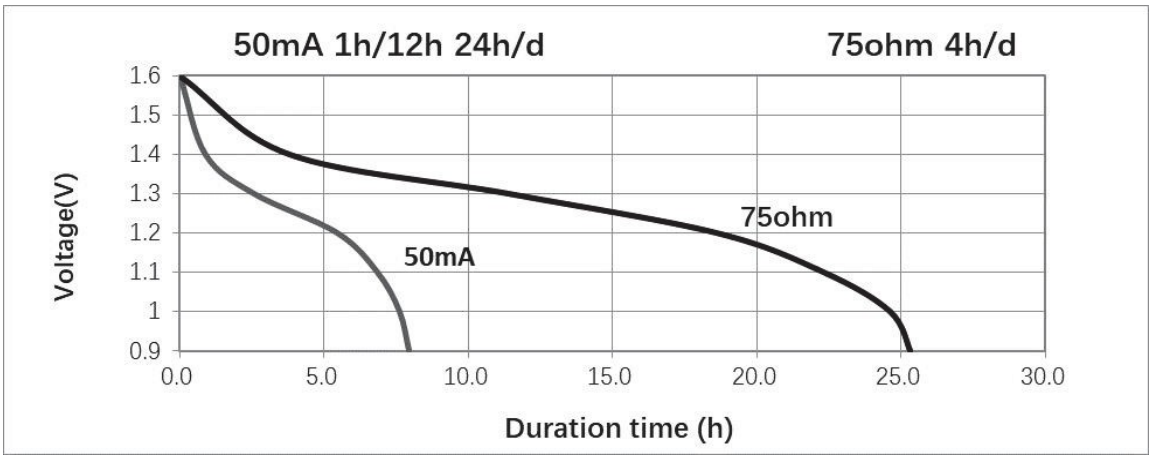
## 12. Discharge diagram




## 13.Storage and stock rotation

13.1 The storage area should be clean, cool, dry, ventilated and weatherproof. For normal storage, the temperature should be between +10 °C and +25 °C and never exceed +30 °C. Relative humidity is below 60%. Extremes of humidity (over 95% RH and below 40% RH) for sustained periods should be avoided since they are detrimental to both batteries and packaging.

13.2 Batteries should therefore not be stored next to radiators or boilers, nor in direct sunlight.

13.3 The height to which batteries may be stacked is clearly dependent on the strength of the pack.
As a general guide, this height should not exceed 1,5m for cardboard packs or 3m for wooden cases.

## 14.Precautions in handling of batteries

When used correctly, primary batteries with aqueous electrolyte provide a safe and dependable source of power. However, battery misuse or abuse may result in leakage, or in extreme cases, fire and/or explosion.

14.1 Make sure the polarities are correct.
Always insert batteries correctly with regard to the polarities (+ and –) marked on the battery and the equipment.

Batteries which are incorrectly placed into equipment may be short-circuited, or charged. This can result in a rapid temperature rise causing venting, leakage, explosion and personal injury.
If 4 batteries are used in series and 1 battery is inverted, then cause of the inverted battery leakage is that has be charged.

14.2 Do not short-circuit batteries.
When the positive (+) and negative (–) terminals of a battery are in electrical contact with each other, the battery becomes short-circuited. For example, loose batteries in a pocket and/or handbag with keys or coins can be short-circuited. This may result in venting, leakage, explosion and personal injury.



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Store unused batteries in their original packaging away from metal objects. If already unpacked, do not mix or jumble batteries.

To prevent any possibility of inadvertent short circuiting, do not stack or jumble batteries and always use designated containers for transport and storage.

14.3 Before using the battery, check whether the positive (+) and negative (–) terminals of the battery and electrical appliance are normal, whether there is bending or damage, whether the surface is clean, whether there is moisture and foreign matter, to avoid bad contact (between battery and electrical appliance) and battery short circuit.

14.4 Do not mix old and new batteries or batteries of different types or brands.
When replacing batteries, replace all of them at the same time with new batteries of the same brand and type.

When batteries of different brand or type are used together, or new and old batteries are used together, some batteries may be over-discharged due to a difference of voltage or capacity. This can result in venting, leakage and explosion and may cause personal injury.

14.5 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 may occur causing damage to the appliance and/or personal injury.

14.6 Keep batteries out of the reach of children. Do not allow children to replace batteries without adult supervision.

If swallowed, the battery may cause chemical burns and other personal injuries. In case of swallowing, seek medical attention immediately.

14.7 Do not expose batteries to heat. Do not dispose of batteries in fire. Do not dismantle batteries.
Do not charge batteries. Do not weld or solder directly to batteries. Do not force discharge batteries.
Otherwise, the battery may leakage, or explode, which may cause personal injury.

## 15. General guidance for appliance design

15.1 Clearly indicate the type of battery to use, the correct polarity alignment (+ and –) and directions for insertion.

15.2 To overcome the problems associated with the reversed placement of a battery, consideration should be given at the design stage to ensure that batteries cannot be installed incorrectly or, if so installed, will not make electrical contact (see Figure 1).



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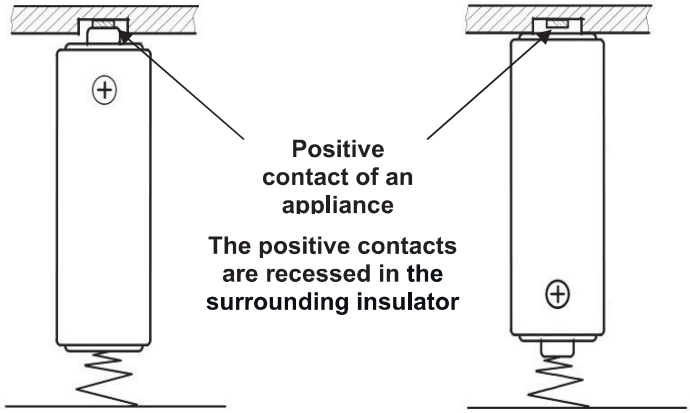


**Figure 1 – Example of the design of a positive contact of an appliance**

15.3 Electrical contact parts and extreme materials and shapes should be appropriate to enable them to form and maintain effective electrical contact. Materials should be materials with strong conductivity, high corrosion resistance, not easy oxidation and elasticity (such as nickel-plated stainless steel). Shapes and styles should avoid causing short circuit of batteries (such as positive and negative spring shrapnel piercing trademarks and causing positive and negative battery conduction, as shown in Figure 2). The negative end of the battery cabin should have a bulge that can fully contact the negative electrode of the battery.

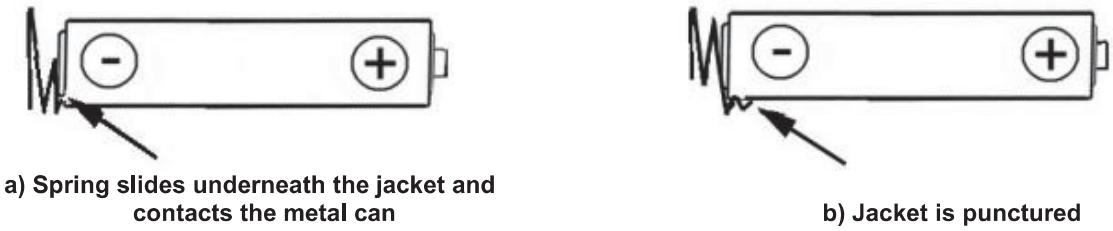


**Figure 2 – Examples showing distorted spring**

15.4 The battery compartment shall be designed to allow only batteries of specified size to fit into and form contact.

15.5 Battery cabin design should try to avoid water to avoid battery and electrical contact rust; not easily opened by children; the battery compartment shall be isolated from the heat generated by electrical appliances.



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# 产品规格书

## R03 / 7 号 / AAA 碳性电池规格书

电池型号：R03 / 7 号 / AAA 双鹿碳性

制 造 商：宁波丰银电池有限公司

制造商地址：浙江省宁波市鄞州区五乡镇时代路 339 号

编　　制：崔张卉

审　　核：

批　　准：

发布日期：2026-2-25

电话：0574-87990736
免费销售服务热线：400-8760600
网址：http://www.sonluk.com

## 1. 适用范围

本规格书适用于 R03 Super Heavy Duty（PVC/铝膜）无汞无镉无铅电池。

## 2. 法律和法规要求

| GB 国家标准 | IEC 标准 | 欧盟标准 |
|---|---|---|
| GB/T 8897.1<br>GB/T 8897.2<br>GB 8897.5 | IEC 60086-1<br>IEC 60086-2<br>IEC 60086-5 | (EU) 2023/1542<br>(EU) 2025/40 |

## 3. 概要

3.1 产品规格

| IEC/JIS/GB | 俗称 |
|---|---|
| R03 | 7 号（中国）<br>AAA（美国）<br>UM4（日本） |

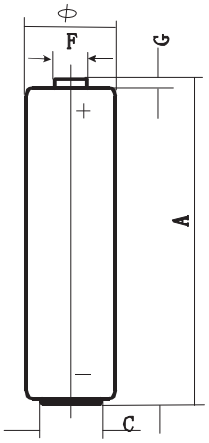
3.2 化学体系: $Zn/ZnCl_2$-$NH_4Cl$-$H_2O/MnO_2$

3.3 标称电压: 1.5 V

3.4 重量: 约 6.9g

3.5 尺寸 (mm)

| / | 最小 | 最大 |
|---|---|---|
| Φ | 9.8 | 10.5 |
| A | 43.5 | 44.5 |
| C | 4.3 | - |
| F | - | 3.8 |
| G | 0.8 | - |




3.6 容量：约 380mAh（放电方式：75Ω, 4h/d , 20°C, 终止电压= 0.9V）

3.7 工作温度：-18°C ~+35°C，以+10°C ~+25°C 为佳

3.8 重金属含量：Hg≤0.0001%, Cd≤0.0020%, Pb≤0.0040%



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## 4. 外观

目视检查电池外观，应至少距离电池 30 厘米。电池无凹陷、划痕、生锈或内部物质流出（如封口剂等）。电池不得有可能影响实际使用或性能的外观缺陷。

## 5. 电池性能

除非另有说明，所有测试都要在下列标准环境下进行。
**20°C±2 °C**
**55+20/-40% RH.**

所有样品测试前，至少在上述的环境中存储 8 小时以上。
测量电压的仪器准确度应不低于±0.1%。
负荷电阻（包括外电路所有部分）的阻值与规定值之间的误差应不大于±0.5%。

5.1 开路电压和负载电压 (负载电阻 3.9Ω, 0.3S)

| / | | 开压(V) | 负压(V) |
|---|---|---|---|
| 初始期 | 最小值 | 1.60 | 1.40 |

5.2 放电性能

| 负载 | | 3.9Ω | 5.1Ω | 24Ω | 75Ω | 5.1Ω | 50mA |
|---|---|---|---|---|---|---|---|
| 测试方式 | | 24h/d | 4m/h 8h/d | 15s/m 8h/d | 4h/d | 1h/d | 1h/12h 24h/d |
| 终止电压 | | 0.9V | 0.9V | 1.0V | 0.9V | 0.8V | 0.9V |
| 单位 | | 分钟 | 分钟 | 小时 | 小时 | 分钟 | 小时 |
| 应用 | | 参考 | 手电筒 | 遥控器 | 收音机 | 玩具 | 数码录音机 |
| 初始期 | 国标 | / | 50 | 4 | 20 | 30 | 3 |
| | 最小平均值 | 36 | 78 | 7 | 24 | 75 | 7 |

s:秒 m:分钟 h: 小时 d: 天

备注: 1) 初始期电性能测试应在电池生产后 30 天内进行。电池应在温度 20±2°C, 相对湿度 55±20% 环境条件下储存。
2) 贮存 12 个月后放电性能为初始期最小平均放电时间的 80%。

## 6. 防漏性能

6.1 过放电耐漏性能测试

测试条件：在温度 20±2°C，相对湿度 55+20/-40% 的条件下，3.9Ω负载电阻连续放电至 0.6V。
测试电池数：8 个。
要求：电池在测试过程中无漏液或爆炸。


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## 7. 安全性能

7.1 自由跌落

此测试模拟电池突然跌落的情形。

测试条件：将未放过电的电池从 1 米的高度跌落到混凝土表面，每个被测电池跌 6 次，在 3 个轴方向上各跌 2 次。然后将电池放置 1 小时。

测试电池数：5 个。

要求：电池在检查过程中无起火或爆炸现象，但允许漏液。

7.2 短路防爆性能

此测试模拟在电池日常装卸时可能发生的外部短路。

测试条件：将未放过电的电池的正负极直接连接起来，然后放置 24 小时或至电池的温度降到环境温度。电路中的连接电阻不得超过 0.1Ω。

测试电池数：5 个。

要求：电池在检查过程中无起火或爆炸现象，但允许漏液。

## 8. 有效期

3 年

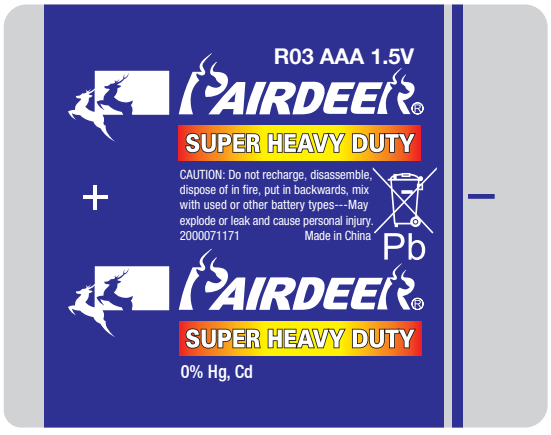
## 9. 日期唛

9.1 除非另有说明，中国大陆地区销售的中文电池，每个电池上标注有效期（YYYY-MM）；中国大陆以外地区销售的，以及英文电池，每节电池上标注建议使用的截止日期（MM-YYYY）。

## 10. 包装要求

10.1 电池所使用的包装材料和印刷油墨中铅、镉、汞、六价铬等重金属的总含量不超过 100ppm。所有包装材料生产过程中不使用对臭氧层有破坏作用的物质。

10.2 每个电池商标上的印刷清晰、持久。其它可根据双方要求，协商解决。





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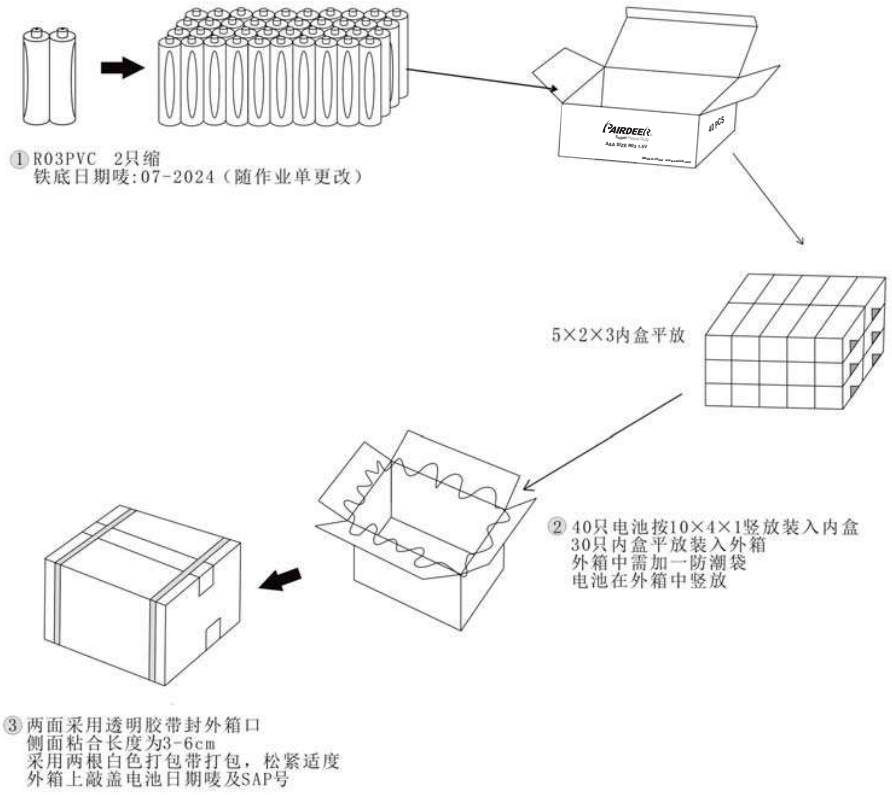
10.3 包装规格如下：




注： "△" 仅表示内盒摆放方向

10.4 其它包装装运要求应符合双方约定的包装规格。

## 11.电池物质成分

| 物质成分 | 重量百分比约值 (%) | CAS NO. | 物质成分 | 重量百分比约值 (%) | CAS NO. |
|---|---|---|---|---|---|
| 二氧化锰($MnO_2$) | ~28.1 | 1313-13-9 | 乙炔黑 (Acetylene Black) | ~5.1 | 1333-86-4 |
| 锌(Zn) | ~30.4 | 7440-66-6 | 钢(Fe) | ~2.34 | 7439-89-6 |
| 水($H_2O$) | ~14.2 | 7732-18-5 | 镍(Ni-plating) | ~0.06 | 7440-02-0 |
| 氯化锌($ZnCl_2$) | ~7.0 | 7646-85-7 | 聚乙烯(PE) | ~1.6 | 9002-88-4 |
| 氯化铵($NH_4Cl$) | ~1.0 | 12125-02-9 | 碳(Carbon) | ~7.3 | / |
| 纸（Paper） | ~1.7 | / | 聚氯烯 PVC | ~1.2 | |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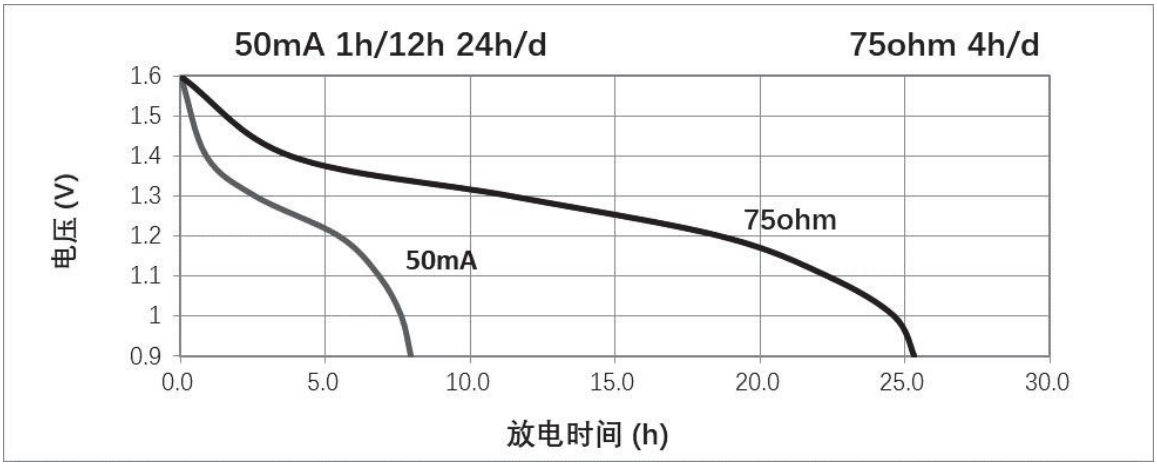
## 12.放电曲线




## 13.电池贮存注意事项

13.1 为保证电池寿命，电池应贮存在干燥，温差小的凉爽环境中。避免暴露在阳光直射，或过热潮湿的地方。正常的贮存温度应在 10°C ~25°C 之间，建议不应当超过 30°C，相对湿度在 60%以下，同时应避免长时间处于极端湿度下（相对湿度高于 95%或低于 40%）。

13.2 请勿将电池直接曝晒于太阳下或直接与水分接触，以防止影响电池性能。

13.3 电池箱堆叠的高度取决于包装箱的强度。一般规定，纸质包装箱堆放高度不得超过 1.5m，木箱不得超过 3m。

## 14.电池使用注意事项

当正确使用时，碳性锌锰电池是一种安全可靠的电源。但是如果不正确操作，则可能导致电池漏液，造成用电器故障或损伤，在极端情况下还有可能爆炸或着火。为保证电池的使用安全，请明确以下警示：

14.1 请确保电极正确
应按电池及用电器上标明的极性标志（“+”、“ - ”）正确地装入电池。如在安装时电池的“+”、“ - ”极装反，电池在一些设备上会出现短路现象；若4个电池串联使用，1个电池装反，那么装反的电池会被充电而气胀，漏液。

14.2 请勿短路电池
当电池的“+”、“ - ”极直接接触或通过金属物质接触时，会造成电池短路，使电池温度迅速升高，导致泄放、泄漏、爆炸和人身伤害。为避免任何意外的短路现象，请不要损坏电池商标；请避免电池与导电的金属、物品接触；避免堆积电池或参杂电池，建议将电池存放在原包装内，盛装在不导电的容器中；建议用指定设计包装进行运输和贮存。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14.3 电池装入用电器前，检查电池、用电器正负极触件是否正常，是否有弯曲或损坏，表面是否清洁，有无水分和异物，避免电池接触不良或短路。

14.4 请勿混用新旧电池或不同类型或品牌的电池
更换电池时，要用相同品牌、相同类型的新电池，同时换掉所有电池。当不同品牌或种类的电池一起使用，或新旧电池一起使用时，由于电池的电压或容量的不同，会使一些电池过放电而导致泄放、泄漏和爆炸，有可能造成人身伤害。

14.5 如果长时间不使用电池，应将电池及时从用电器中取出，避免电池在用电器里过度放电而导致泄漏。

14.6 电池应放在儿童拿不到的地方。无成人监督时不要让儿童更换电池。误吞食电池会导致化学灼伤等人身伤害。万一误吞，应立即就医。

14.7 禁止加热、用火处理电池，禁止拆解拆卸破坏电池，禁止将电池充电，禁止直接焊接电池，禁止强制电池放电，否则会导致电池泄放、泄漏和爆炸，有可能造成人身伤害。

## 15. 用电器设计指南建议

15.1 用电器应清晰标明适用电池的类型。电池舱上应清晰地标明装入电池的方向（极性）。

15.2 应设计有防止电池反向安装的措施，或者即使装错也无法形成电接触（如图 1 所示）。应设计辅助电路防止电池倒装。

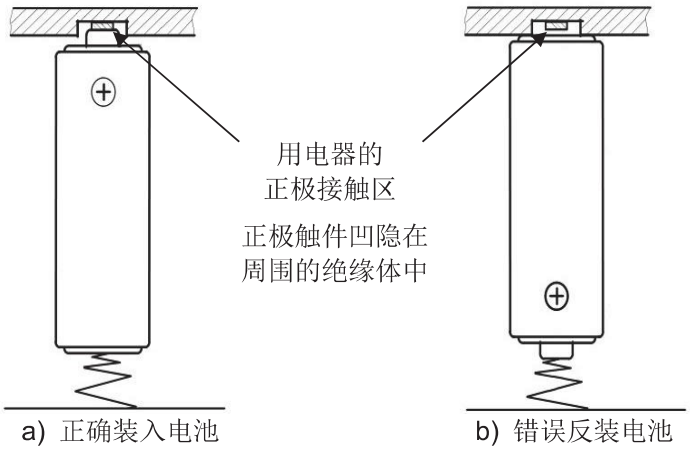


**图1 用电器正极接触件设计示例**

15.3 电接触件和极端材料及形状应合适，使之能形成并保持有效的电接触，材料应选择导电性强，耐腐蚀性高不易氧化，有弹性的材料（如镀镍不锈钢），形状样式需避免引发电池短路（如正负极弹簧弹片尖锐刺破商标等致使电池正负极导通，如图2所示），电池舱负极端需有凸起能与电池负极充分接触。


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a) 弹簧滑到商标之下并接触到金属外壳　　b) 商标被刺破

**图2 弹簧扭曲变形的示例**

15.4 电池舱应设计成只允许规定尺寸的电池能装入并形成接触。

15.5 电池舱设计应尽量避免水的进入避免电池及用电器触件生锈；不易被儿童打开；电池舱应和用电器产生的热量相隔离。