Powerhouse Two Inc.

*Excellent Quality, Prompt Delivery and Competitive Price*

# Technical Specification

XP Alkaline Manganese Dioxide Battery

To: PH2

Model: ***PH-AAA-XP***

Prepared by: GH

Checked by: TW

Approved by: CC

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# Powerhouse Two Inc.

## 1. Scope

This specification is applicable to Powerhouse Two's XP Super Alkaline Battery.

### 1.1 Designations

| | | | | | |
|---|---|---|---|---|---|
| PH-AAA-XP | LR03 | AM-4 | 24A | AAA | E92 |

### 1.2 Reference Document

IEC 60086-1 (2006-12) – Primary Batteries – Part 1: General
IEC 60086-2 (2006-12) – Primary Batteries – Part 2: Physical and Electrical Specifications
IEC 60086-5 (2006-12) – Primary Batteries – Part 5: Safety of batteries with aqueous electrolyte

## 2. Chemical System Alkaline Manganese Dioxide

- Mercury and Cadmium are not added

## 3. Nominal Voltage 1.5 volt

## 4. Average Weight 11.0 g

## 5. Nominal Capacity 1100 mAh

Condition: Discharge 4 hours per day at 20 $\pm$ 2° C under 75Ω load to EPV 0.9V.

## 6. Electrical Characteristics

Test Conditions: Tested within 30 days after delivery

Load resistance: 3.9 ohms ± 0.5%
Temperature: 20 ± 2 ° C
Measuring time: 0.3 seconds

| | Off-Load Voltage OCV (V) | On-Load Voltage CCV (V) | Test Specification |
|---|---|---|---|
| New Battery | 1.58 | 1.45 | MIL-STD-105E Class II Double Sampling, AQL=0.4 |
| After 3 months at Temp. 45° -C | 1.55 | 1.40 | |
| After 12 months at Room temperature | 1.55 | 1.40 | |

## 7. Service Output

Test Conditions: Tested within 30 days after delivery

Temperature: 20 ± 2 degrees C and 60±15% RH

| Standard | Discharge Condition | | | Average Minimum Discharge Time | | |
|---|---|---|---|---|---|---|
| | Discharge Load | Daily Discharge Time | EPV (V) | New Battery | After 3 Months at 45 C | After 12 Months at Room Temp |
| IEC | 75 Ω | 4 h/d | 0.9 V | 68 h | 62 h | 62 h |
| IEC | 10 Ω | 1h/d | 0.9 V | 8 h | 7 h | 7 h |
| IEC | 100 mA | 1 h/d | 0.9 V | 9.5 h | 8.5 h | 8.5 h |
| REF | 3.9 Ω | 24 h/d | 0.9 V | 150 min. | 130 min. | 130 min. |
| | | | | | | |

Acceptance Criteria

1. Nine (9) pieces of battery product will be tested for each discharging standard

2. 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.

3. One re-test is allowed to confirm the previous result

## 8. Electrolyte Leakage Resistance

| Item | Condition | Period | Requirements | Acceptance Standard |
|---|---|---|---|---|
| Over-discharge Characteristics | 1. 10 Ω continuous discharge<br>2. Storage Temp – 20± 2 ° C<br>3. Relative Humidity 90 ± 20% RH | 48 Hrs. | There shall be no deformation exceeding the specified dimensions, nor leakage recognized by the human eye. | N=30<br>Ac=1<br>Re=2 |
| High heat and humidity storage | 1. Storage Temp 60 ± 2° C<br>2. Relative Humidity 90 ± 5% RH | 30 Days | | N=30<br>Ac=1<br>Re=2 |

## 9. Safety Characteristics

| Item | Condition | Period | Requirements | Acceptance Standard |
|---|---|---|---|---|
| External Short Circuit | Short positive and negative terminal with .1 Ω resistor | 24 Hrs. | There shall be no explosion of the battery | N=9<br>Ac=0<br>Re=1 |
| Over discharge | Connect 3 new cells with 1 discharged cell until voltage drops to 2.4V | 24 Hrs. | | |

## 10. Marking

The following markings will be printed, stamped, or impressed on the body of the battery.

| | | |
|---|---|---|
| 1. Designation | PH-AAA-XP Alkaline | |
| 2. Polarity | | "+" & "-"<br>Located on cathode can |
| 3. Others | | 3.1 1.5V GSLR03A AM4 LR03<br>3.2 AAA Size 0.00% Mercury & Cadmium<br>3.3 Made in China<br>3.4 Marking of separate collection (Logo) |
| 4. Warning | | Do not dispose of in fire, recharge, put in backwards, or mix with used or other battery types. May explode or leak and cause personal injury. |

## 11. Caution for Use

1. Since the battery is not manufactured for recharging, there are risks of electrolyte leakage causing damage to the device if the battery is recharged.
2. The battery shall be installed with its "+" and "-" polarity in the correct position, otherwise it might cause a short circuit.
3. Short circuiting, heating, or disposing into fire and disassembling is prohibited.
4. Battery cannot be subjected to a forced discharge, which can lead to internal gas generation which may result in bulging, leakage, and de-crimping of cap.
5. New and used batteries cannot be used at the same time. When replacing batteries, replace all batteries together with the same type.
6. Exhausted batteries should be removed from compartment to prevent over-discharge, which causes leakage and damage to the device
7. Direct soldering will cause damage to the battery
8. Battery should be kept out of the reach of children to prevent swallowing. In case of accident, contact physician immediately.
9. The battery should never be dismantled or deformed.

## 12. Shelf Life

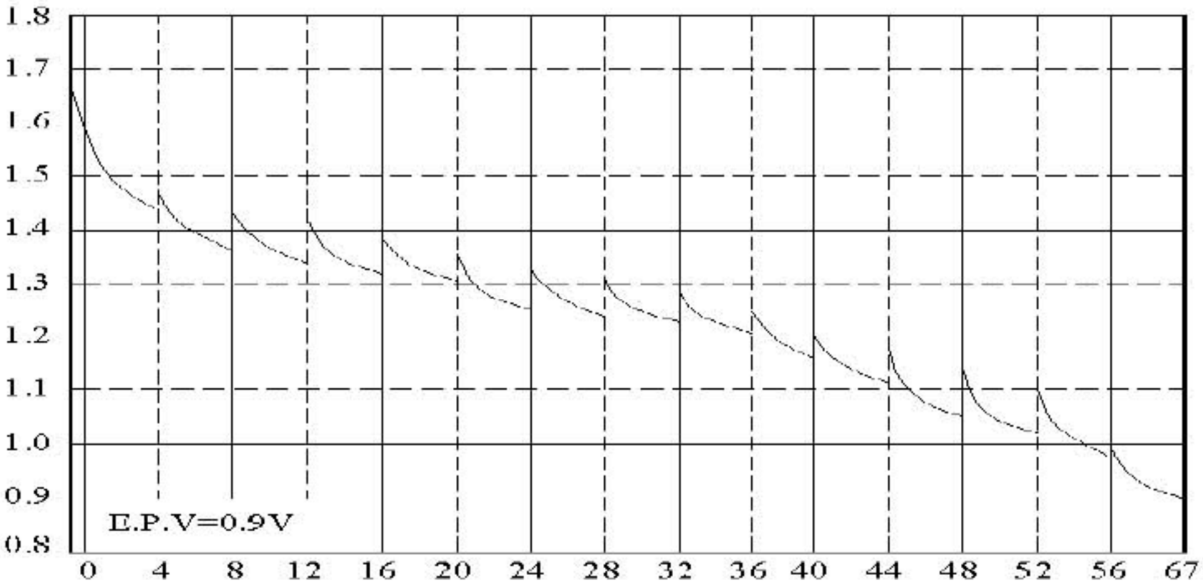
5 Years after delivery under proper storage conditions. (90% original charge)

Storage Conditions

Temperature 20 ± 2° C  Relative Humidity 65 ± 20% RH

## 13. Discharge Curves

Fig. 1  Test Temperature - 20 ± 2° C
Discharge Method – 75 Ω 4 hr/day

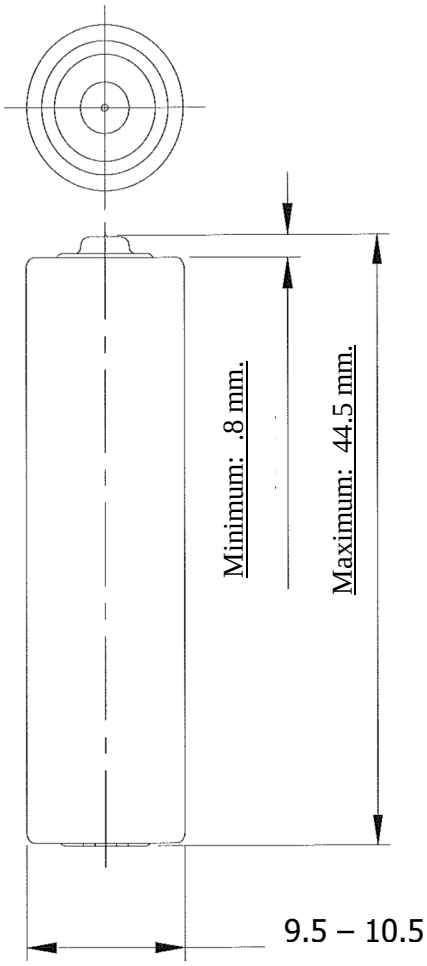



## 14. Compliance & Environmental Information

This product complies with the EU RoHS Directive 2002/95/EC and Battery Directive 2006/66/EC and meets all US standards set by the EPA for Alkaline Manganese batteries. MSDS available upon request.

## 15. Battery Dimension

PH-AAA-XP Battery Dimensions and Structure




| Powerhouse Two Inc. | | |
|---|---|---|
| Model: PH-AAA-XP | Drawing number: DWG-S-001 | |
| Scale: NTS | Dim: mm | Approved by: |
| Date: 11/01/2016 | Drawn by: Kelvin | T. Wirbel - C. Chu |
| Tolerances: Linear ± 1 Angular ± ¼ 3rd angle projection | | |