POWERHOUSETWO

Technical Specification

XP Alkaline Manganese Dioxide Battery

Power XP Alkaline

PH-D-XP

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1. Scope

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

1.1 Designations

PH-D-XP	GSLR20	L20	AM-1	D	13A

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

- 0.00% Mercury and Cadmium
- Zinc, EMD, Potassium Hydroxide, Graphite

3. Nominal Voltage 1.5 volt

4. Average Weight 142

5. Nominal Capacity 15000 mAh

Condition: Continuous discharge at 20 ± 2° C under 10 Ω resistance - 4 hours per day 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 RH: 60 ± 15%

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	10 Ω	4 Hr. / Day	0.9 V	120 Hours	110 Hours	110 Hours
IEC	3.9 Ω	1 Hr. / Day	0.8 V	40 Hours	37 Hours	37 Hours
REF	600 mA	2 Hr. / Day	0.9 V	17 Hours	15 Hours	15 Hours
REF	2.2 Ω	4 M per Hr. 8 Hr. / Day	0.9V	22 Hours	20 Hours	20 Hours

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 Proof Characteristics

Item	Condition	Period	Requirements	Acceptance Standard
Over-discharge Characteristics	10 Ω continuous discharge Storage Temp – 20± 2 ° C Relative Humidity 60 ± 15% RH Time 24 Hours / day	48 Hrs.	There shall be no deformation exceeding the specified dimensions, nor leakage recognized by the human eye.	N=30 Ac=1 Re=2
High Heat and Humidity Test	Storage Temp 60 ± 2° C Relative Humidity 90 ± 5% RH	30 Days		N=30 Ac=1 Re=2

9. Safety Characteristics

Item	Condition	Requirement	Requirements
Drop Test	Free drop from 1M	6 Times / 1 Hour	There shall be no explosion of the battery
External Short	Short positive & negative terminals	0.1 Resistor / 24 Hrs.	
Improper installation	4 Batteries connected in series w/ 1 battery reversed	Battery leak or drop to 0V	
Over Discharge	Connect 3 new batteries and 1 discharged battery in series	Voltage drop to 2.4V	

10. Marking

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

1. Designation	PH-D-XP Alkaline
2. Polarity	"+" & "-" Located on cathode can
3. Others	3.1 1.5V GSLR20 AM1 LR20 3.2 C Size 0.00% Mercury & Cadmium 3.3 Made in China 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

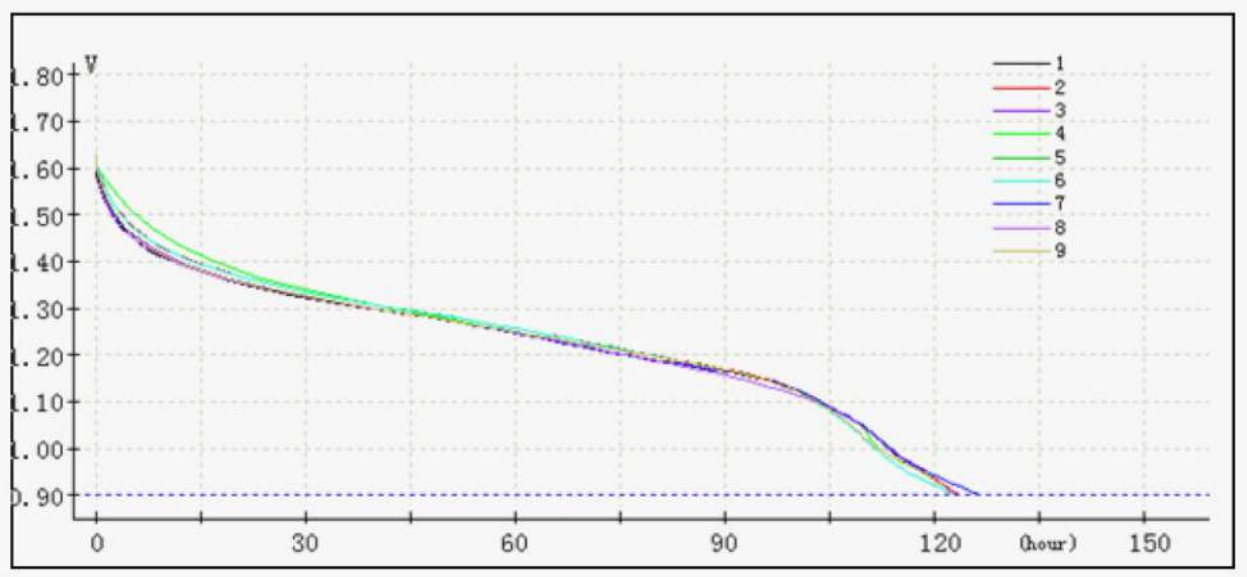
10 Years after delivery under proper storage conditions. (80% original charge)

Storage Conditions

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

13. Discharge Curves

Fig. 1 Test Temperature - 20 ± 2° C
Discharge Method – 10 Ω 4 hr/day

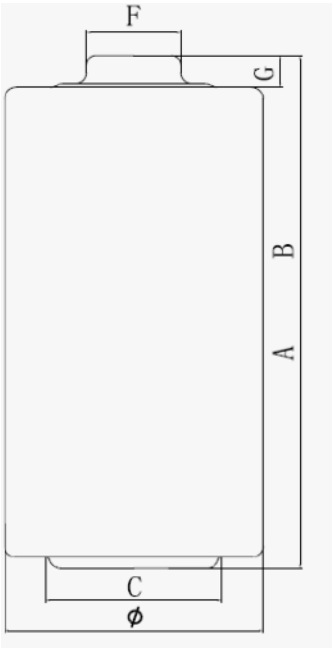


14. Compliance & Environmental Information

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-D-XP Battery Dimensions and Structure



Key

A – Max 61.5 mm
B – Max 59.5 mm
C – Min 18.0 mm
F – Max 9.5 mm
G – Min 1.5 mm
Ø – Max 34.2 mm
Ø – Min 32.3 mm

Powerhouse Two Inc.		
Model: PH-D -XP	Drawing number: DWG-S-005	
Scale: NTS	Dim: mm	Approved by:
Date: 03/24/2020	Drawn by: Kelvin	G. Halteman - C. Chu
Tolerances: Linear ± 1 Angular ± ¼ 3rd angle projection		