Specification Approval Sheet

Name：Zinc Manganese Dioxide Battery

Model： AKYGA R03P AAA

SPEC：1.5V / 450mAh

Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By
	Release 1	2024-12-27	

Content

1. Summary

This specification applies to R03P carbon zinc battery produced by Akyga Battery.

1.1 Model No.

IEC& GB: R03 ANSI: AAA JIS: UM-4

1.2 Reference Standard

IEC 60086-1 :2015 --- Primary Batteries - Part 1: General

IEC 60086-2 :2015--- Primary Batteries - Part 2: Physical and electrical specification

IEC 60086-5 :2015--- Primary Batteries - Part 5:safety of batteries with aqueous electrolyte

1.3 Execution Standard:

GB/T 8897.2-2021

2. Electrochemical system

Zinc - Zinc Chloride - Manganese Dioxide

*** NO MERCURY IS ADDED IN THE BATTERY**

3. Nominal Voltage: 1.5 V

4. Average Weight : 7.0±0.2g

5. Nominal Capacity

450mAh (Conditions: with 75Ω resistance load, 4h/d, end voltage: 0.9V, operating temperature: 20±2°C)

6. Electrical Performance

(Conditions: load resistance (±0.5%) 3.9Ω, measuring time: 0.3s, temperature: 20±2°C)

	OCV (V)	Load Voltage (V)	Accepted Levels
New Battery	≥1.66	≥1.40	MIL-STD105E , II , AQL=1.5

7. Discharge Performance

(Conditions: Temperature: 20±2℃ , Relative Humidity: 55±10% RH)

	Discharge Condition			Discharge Time	
IEC ITEM	Load	Daily Period	End Volt	New Battery (MAD)	Accepted Level
	5.1Ω	4min/h, 8h/d	0.9V	50 min	90min
	5.1Ω	1h/d	0.8V	30 min	80min
	24Ω	15s/m, 8h/d	1.0V	4 h	8.0h
	75Ω	4h/d	0.9V	20 h	26h
	50mA	1h/12h, 24h/d	0.9V	3 h	8.5h
	3.9Ω	24h/d	0.9V	/	40-45min

Acceptance method：

1) Select 9 batteries for each testing item from a single delivery.
2) The conditions of test qualified:
   The average result is greater than or equal to the minimum average discharge time, and the quantity of signal battery's discharge time which below minimum average of 80% is less than one.
3) It need a retest sampling if the first one unqualified. The second test is passed, it should be judged qualified.

8.Leakage Resistance

(Conditions: Temperature: 20±2℃ , Relative Humidity: 55±10% RH)

Load	Daily period	End voltage	Technical requirement	Accepted levels
5.1Ω	4m/h,8h/d	0.6V	No leakage No distortion	N=9, Ac=1, Re=2
10Ω	1h/d			
24Ω	15s/m,8h/d			
75Ω	4h/d			

9.Safety Performance

9.1.1 Test of safety under normal conditions

Item	Inspection method and procedure	Requirements
Storage after partial discharge	Non discharged battery conducts discharging test with condition of 1.8Ω,15s/m,24h/d until the shelf life has reduced 50% of the MAD, then stored under 45℃±5℃ for 30 days.	Battery no leakage, no explosion, no fire
Transportation-vibration	(1)Make a record of the battery OCV; (2)Simple harmonic vibration： amplitude: ±0.8mm；frequency variatio:1Hz/min;frequency range:10Hz-55 Hz; vibrating direction: three directions of mutually perpendicular of battery; vibration time: 85min-95min; (3)Store the battery for 1h after vibration.	Battery no leakage, no explosion, no fire

Transportation-impact	(1)Make a record of the battery OCV; (2)Impact: initial 3ms minimum mean acceleration: 75×9.8m/s^2; maximum acceleration: 150×9.8m/s^2; impact direction: three battery directions that are perpendicular to each other; impact times: one time for each direction; (3)After impact, battery to be stored for 1h.	Battery no leakage, no explosion, no fire
Climate-temperature cycle	(1)One temperature cycle: 70℃,4h→20℃,2h→-20℃,4h→20℃; (2)Interval time of temperature conversion: ≤30min; (3)Battery conducts 10 temperature cycles; (4)Battery stores for 7days after the cycle.	Battery no explosion, no fire

9.1.2 Reasonable Predictable Misuse

Item	Inspection method and procedure	Requirements
Improper installation	If four pieces of non discharged battery are connected in series, with one of the tested battery in reverse connection, connect the circuit until the battery surface temperature drops to ambient temperature, connecting resistance in the circuit < 0.1Ω.	Battery no explosion, no fire
Over-discharge	Battery to be tested first conducts predischarge test (43Ω, 4h/d, cut-off:0.6V), and then connect with three non discharged batteries and 7.5Ω resistance in series, connecting the circuit until the total circuit voltage reduced to 2.4V.	Battery no explosion, no fire
External short-circuit	Conduct continuous short-circuit of the tested battery until the battery surface temperature drops to the ambient temperature. Connecting resistance in the circuit < 0.1Ω.	Battery no explosion, no fire
Free-drop	If the battery free drops from one-meter height to the concrete surface, each of the three perpendicular axes drops twice, store the battery for 1h after a total of six time drops.	Battery no explosion, no fire

Definition of battery explosion: solid material ejected instantaneously 25cm away from any part of the battery.

10. Identification

The contents of the label:

(1)Model: R03 AAA

(2)Registered Trademark: Akyga

(3)Nominal Voltage: 1.5V

(4)Battery Poloidal: "+" and "-"

(5)Warning words: Install and use correctly. Do not recharge, disassemble, heat and short-circuit.

11. Precaution and Handling:

(1) Do not recharge the batteries. May cause leak or explode if charged.

(2) To install batteries following the instructions of"+"and"-".

(3) Do not short-circuit, heat, dispose in fire or disassemble.

(4) Do not over-discharge batteries. Over- discharging battery may destroy the appliance.

(5) Do not mix with used or other battery type at the same time. Make sure use the same brand and replace all batteries.
(6) Remove batteries from device when it is not in use. Over-discharge may destroy the appliance.
(7) Do not allow metal objects to contact the battery terminals. It may destroy the battery.

12.Shelf Life

24 months （Temperature: 20 ± 2° C，Relative humidity : 55 ± 10%RH）

13.Dimensions of R6P:

Item	Min.	Max.	Accepted levels
Diameter	9.8 mm	10.5 mm	N=20，Ac=1，Re=2
Total height	43.5 mm	44.5 mm	N=20，Ac=1，Re=2