

TECHNICAL SPECIFICATION
FOR
CARBON ZINC BATTERY
TYPE: R03P(Metal No Lead)

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Prepared by		Approved by	

Guangdong TIANQIU Electronics Technology Co. Ltd.

ADD: 9/F TianQiu Business Building No.16-30, He Yi Rd., San Yuan Li Ave., GuangZhou China

Tel: 8620-36322277 Fax: 8620-36323339 P.C.:510410

Website: <http://www.tmmq.cn> Email: office@tmmq.com

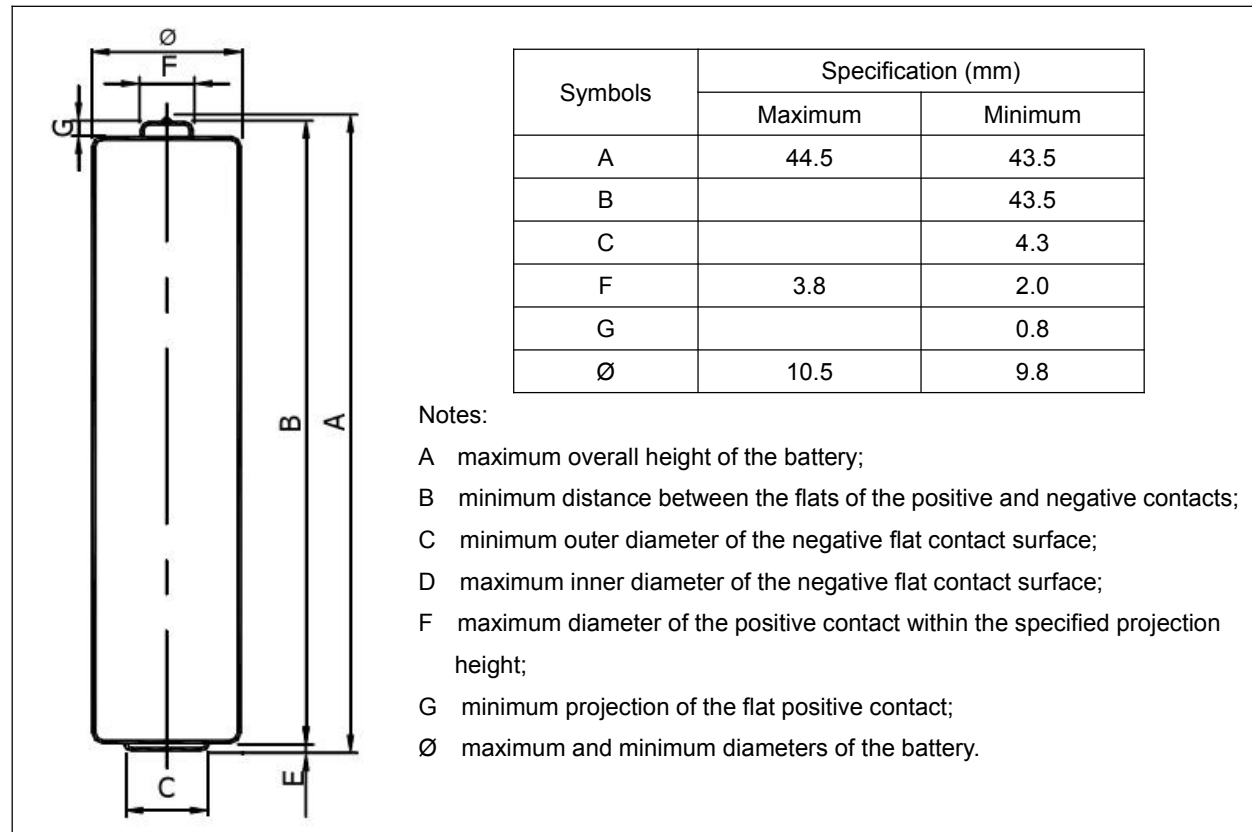
1. Scope

This specification is applicable to the Carbon Zinc Battery R03P supply to by Guangdong TIANQIU Electronics Technology Co. Ltd.

2. Designations

TIANQIU: R03P
IEC: R03
Other: AAA, UM-4

3. Dimensions



4. Technical Specifications

- 4.1 Chemical system: Zinc-Manganese Dioxide (Zinc chloride electrolyte)
- 4.2 Average weight: 8.5g
- 4.3 Nominal voltage: 1.5V
- 4.4 Nominal capacity: 330mAh (Loading at 75Ω resistance, 4h per day, till the voltage down to 0.9V)
- 4.5 Retention:
 - 90% after 12 months storage (20±2°C)
 - 85% after 24months storage(20±2°C)
 - 80% after 36 months storage(20±2°C)
- 4.6 Environmental substance: Hg<5ppm、Cd<20ppm、Pb<40ppm

5. Performance

5.1 Test conditions

Unless otherwise specified, the test conditions shall be, as a general rule, at the temperature of $20 \pm 2^{\circ}\text{C}$ and the relative humidity of $65 \pm 15\%$.

5.2 Electrical characteristics

Storage period	Off-load voltage (V)	On-load voltage (V) (3.9Ω/0.3s)	Sampling plan
Initial	1.60~1.73	≥ 1.35	MIL-STD-105E, General Inspection Lever II, Single Sampling, AQL=0.4
12 months @ RT	1.53~1.68	≥ 1.15	
24 months @ RT	1.52~1.65	≥ 1.12	
36 months @ RT	1.50~1.63	≥ 1.10	

Remark: The initial samples shall be tested within 30 days after delivery.

5.3 Service output

Load resistance	3.9Ω		5.1Ω	10Ω	75Ω	24Ω
Discharge method	24h/d		4m/h 8h/d	1h/d	4h/d	15s/m, 8h/d
End point voltage	1.2V	0.9V	0.9V	0.9V	0.9V	1.0V
Minimum duration (initial)	4.0min	34min	80min	2.5hrs	24.0hrs	6.0hrs
Minimum duration (After 12 months storage)	3.5min	31min	72min	2.3hrs	22.0hrs	5.4hrs
Minimum duration (After 24 months storage)	3.0min	27min	68min	2.0hrs	19.0hrs	5.1hrs
Minimum duration (After 36 months storage)	2.5min	24min	56min	1.8hrs	17.0hrs	4.2hrs

Remark: The initial samples shall be tested within 30 days after delivery.

Acceptance test:

- 1) 9 pieces of battery will be tested for each discharging method.
- 2) The average discharging time from each discharging method shall be equal to or greater than the specified figure, and no more than one battery has a service output less than 80% of the specified figure.
- 3) One retest is allowed to confirm the results if the first test didn't meet the requirements.

5.4 Electrolyte leakage resistance

Item	Test method	Requirements	Acceptance standard
Over-discharge	Continuously discharge at 15Ω to 0.6V.	No deformation exceeding the specified dimensions and no external electrolyte leakage shall be observed by naked eyes.	N=9, Ac=0, Re=1
High Temp. storage	Storage the samples at 45 °C, RH below 70% for 30days		N=40, Ac=1, Re=2

5.5 Safety characteristics

Item	Test method	Requirements	Acceptance standard
Short circuit test	Short circuit for 24 hours.	No explosion	N=5, Ac=0, Re=1
Incorrect installation	Four batteries are connected in series with one reversed, then short circuit for 24 hours.	No explosion	N=20, Ac=0, Re=1

5.6 Shelf life

It can be stored for 3 years under the conditions specified in Appendix G of IEC 60086-1:2021.

Pour une conservation normale, il convient que la temperature soit comprise entre +10 °C et +25 °C et qu'elle ne depasse jamais +30°C. Il convient d'eviter les valeurs extremes d'humidite (HR superieure a 95 % et inferieure a 40 %) pour des periodes prolongees etant donne qu'elles sont prejudiciables aux piles et a l'emballage. Il convient, de ce fait, de ne pas stocker les piles pres de radiateurs ou de chaudières ni en plein soleil.

6. Packing and Marking

Any specific design and packing requirements will be accommodated as required. But as a general, the following markings will be printed, stamped or impressed on the body of the battery:

- 1) Designation: R03P.
- 2) Manufacturer's logo "  " and/or its name "TIANQIU".
- 3) Polarity Marking: " + " and /or " - ".
- 4) Caution: DO NOT RECHARGE, IMPROPERLY INSERT OR DISPOSE OF IN FIRE.
- 5) The battery picture is as follows:



7. Caution for Use

- 1) Since the battery is not designed to be charged, there are risks of electrolyte leakage or causing damage to the device if the battery is charged.
- 2) The battery shall be installed with its “+” and “-” polarity in correct position, otherwise may cause the battery to be charged or over-discharged.
- 3) Short-circuiting, heating, disposing of in fire and disassembling the battery are prohibited.
- 4) Battery cannot be forced discharge, which lead to excess internal gas generation and, may result in bulging, leakage and explosion.
- 5) New and used batteries cannot be mix used at the same time, when replaced batteries, it is recommend to replace all and with the same brand type.
- 6) Exhausted batteries should be removed from compartment to prevent over-discharge, which cause leakage and damage to the device.
- 7) Direct soldering is not allowed, which will damage the battery.
- 8) Keep the battery out of the reach of children to prevent swallow, in case of accident should contact physician at once.
- 9) The battery should not be dismantled and deformed.

8. Referenced Standards

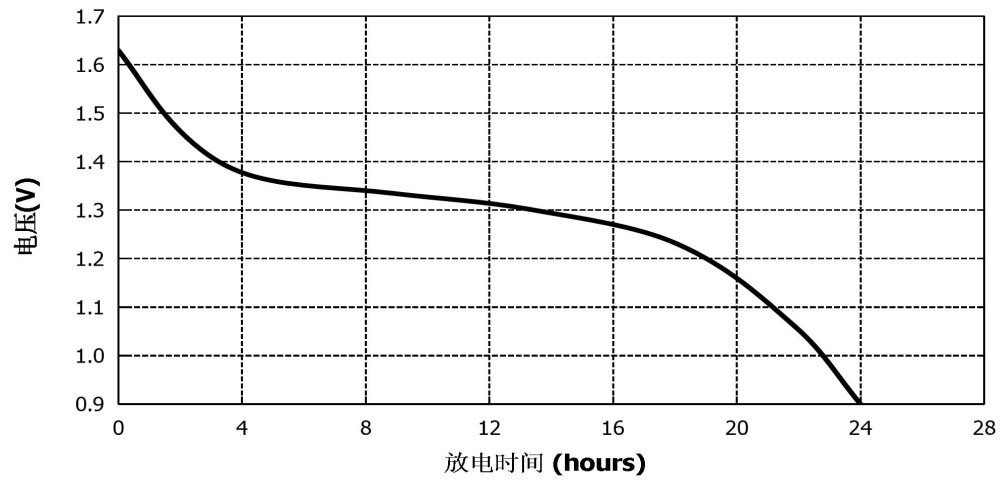
IEC 60086-1: –Primary Batteries –Part 1: General

IEC 60086-2: –Primary Batteries –Part 2: Physical and electrical specifications

IEC 60086-5: –Primary Batteries –Part 5: Safety of batteries with aqueous electrolyte



9. Discharge Curves



Discharge method: 75Ω, 4 hours/day

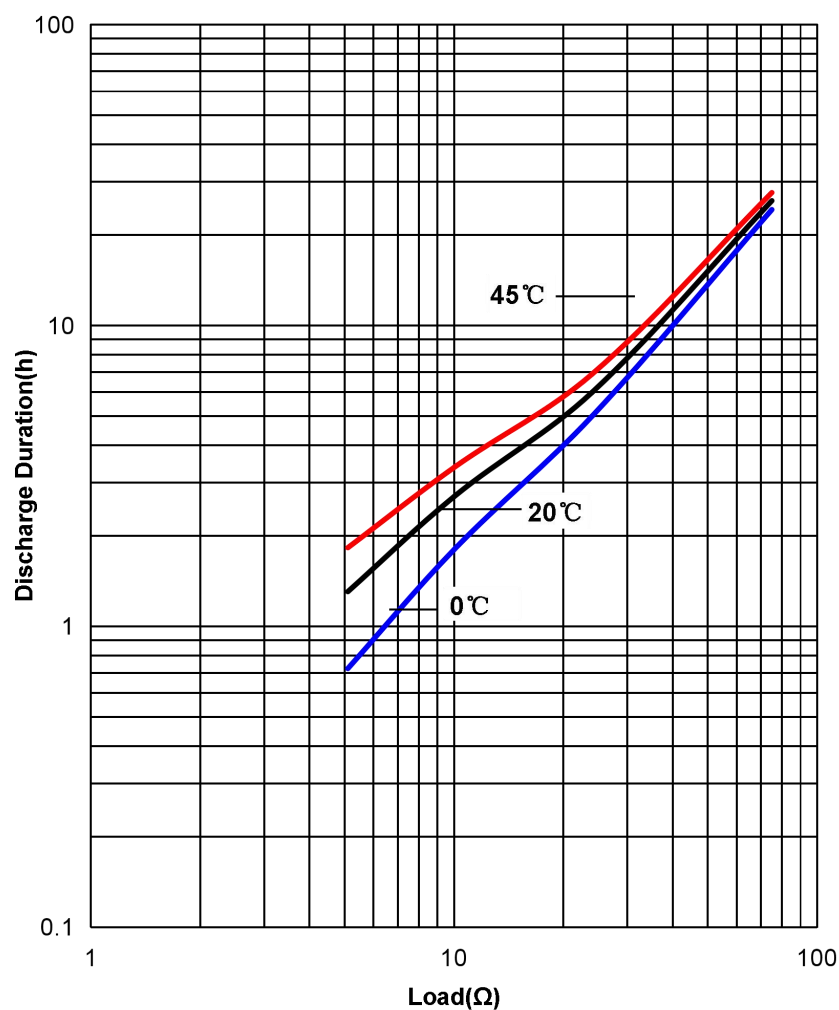
Temperature: 20±2℃



Discharge method: 10Ω, 1 hour/day

Temperature: 20±2℃

10. Temperature Characteristics:



Discharge method: Discharge continuously at various resistance, EV = 0.9V