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TECHNICAL SPECIFICATION
FOR
ZINC MANGANESE DIOXIDE BATTERIES

DURATA® PLUS

R03-Aluminum Foil-704

PROMULGATE DATE: January, 2022

SPEC. No.: TS-ZnMn-704

1. Scope

This specification defines the technical requirement for R03 aluminum foil jacket extra heavy duty batteries.

Cross Reference:	DURATA	IEC	GB	JIS	Other
	704	R03	R03	SUM-4	AAA

2. Purpose

To assure that any R03 aluminum foil jacket batteries manufactured by DURATA will meet and exceed our customers' expectation.

3. Normative Reference

IEC 60086-1: 2021 *Primary Batteries—Part 1: General*

IEC 60086-2: 2021 *Primary Batteries—Part 2: Physical and Electrical Specifications*

IEC 60086-5: 2021 *Primary Batteries — Part 5: Safety of batteries with aqueous electrolyte*

GB 24427-2021 *Content Limitation of mercury, cadmium and lead for anode primary battery*

4. Fundamental Parameter

Item	Data
Item No.	704
Chemical System	ZINC-MANGANESE DIOXIDE (Zinc chloride electrolyte)
Primary Component	Zinc, Manganese dioxide, Acetylene black, Zinc chloride

Item	Data
Nominal Voltage	1.5 volt
Average Weight	7.2 g
Jacket	Aluminum Foil Jacket
Nominal Capacity	440 mAh [a]
Mercury content	Less than 1 ppm [b]
Packing	4 pcs/shrink pack [c]

Note:

a) Discharge condition: 75 Ω - 4 h/d, end point voltage 0.8 v at 20±2 ℃.

b) No mercury is added in the products during manufacturing.

c) We can make various kinds of packages as per the customers' request.

5. Electrical Characteristics

/	Off-load voltage	Short circuit current	Acceptance Standard
Initial [a]	1.670 V	2.5 A	GB/T 2828.1-2012 commonly Ⅰ sampling AQL=0.4
After 12 months	1.620 V	2.0 A	

Note:

a) Initial means that within 60 days after manufacture date, at temperature 20±2 ℃, with relative humidity of (55±20)%.

6. Service Time

Discharge Conditions			IEC Standard	MAD [a]	
Discharge load	Daily period	EV V		Initial	After 12months
3.9 Ω	24 h/d	0.9	/	36 min	30 min
10 Ω	1 h/d	0.9	/	2.4 h	2.1 h
5.1 Ω	b	0.9	50 min	82 min	70 min
5.1 Ω	1 h/d	0.8	30 min	75 min	67 min
50 mA	c	0.9	3 h	7 h	6.3 h
24 Ω	d	1.0	4 h	7 h	6.3 h
75 Ω	4 h/d	0.9	20 h	23 h	20.7 h

Note:

a) Condition: temperature 20±2 ℃, relative humidity (55±20)%.

b) 4 min beginning at hourly intervals for 8 h per day.

c) 1 h per 12 h, 24 h per day.

d) 15 s per minute, 8 h per day.

Explanation:

1) The result of the average discharging time under each discharge condition shall be equal to or more than the average minimum time.

2) 8 pieces of batteries were tested under each discharge condition.

7. Using Advice

The battery is especially suitable for small electric appliances with high current loads, such as remote control, toys, etc.

8. Electrolyte Leak Proof Characteristics

Item	Condition	End Period	Result	Acceptance Standard
Over-discharge	3.9 Ω - 24 h/d discharge at 20±2 ℃, (55±20)% RH	E.P.V= 0.35 V	There shall be no deformation exceeding the specified dimensions, nor leakage [a] recognized by human eye.	N=8 Ac=0 Re=1
Storage	At temperature 20±2 ℃, (55±20)% RH	24 months		Less than 300 ppm
	At temperature 45±2 ℃, (50±15)% RH	90 days		N=40 Ac=1 Re=2
	At temperature 50±2 ℃, (50±15)% RH	48 h		

Note:

a) Leakage means unplanned escape of electrolyte, gas or other material from a battery.

9. Safety Characteristics [a]

Item	Test Procedure	End Period	Result	Acceptance Standard
External short circuit	An undischarged battery is directly connected with its positive and negative polarity.	24 h	There shall be no fire and no explosion [b] of battery.	N=5 Ac=0 Re=1
Incorrect installation	One of four pieces of batteries connected in series has to be connected with its reversed polarity.	24 h		N=20 Ac=0 Re=1
Storage after partial use	Discharge by 5.1 Ω, 4min/h,8 h/d until the service time falls by 50% of MAD value and followed by storage at 45±2 ℃	30days	There shall be no fire and no explosion [b] of battery, nor leakage recognized by human eye.	N=5 Ac=0 Re=1

Note:

a) Condition: at temperature 20±2 ℃.

b) Explosion means an instantaneous release wherein solid matter from any part of the battery is propelled to a distance greater than 25 cm away from the battery.

10. Caution for Use

a) Since this battery is non-rechargeable, it is risky if the battery is charged / recharged and it may lead to electrolyte leakage or damage to the device.

b) The battery should be inserted with regards to polarity (+ and -).

c) Short circuit, heating, forcing discharging, disposing of in fire, welding/soldering and dismantling the battery are prohibited.

d) Replace all batteries of a set at the same time. Different electrochemical systems, grades or brands should not be mixed together. Otherwise, it may lead to leakage.

e) Keep batteries out of the reach of children.

f) Remove exhausted batteries promptly.

11. Shelf Life and Expiry Date Marking

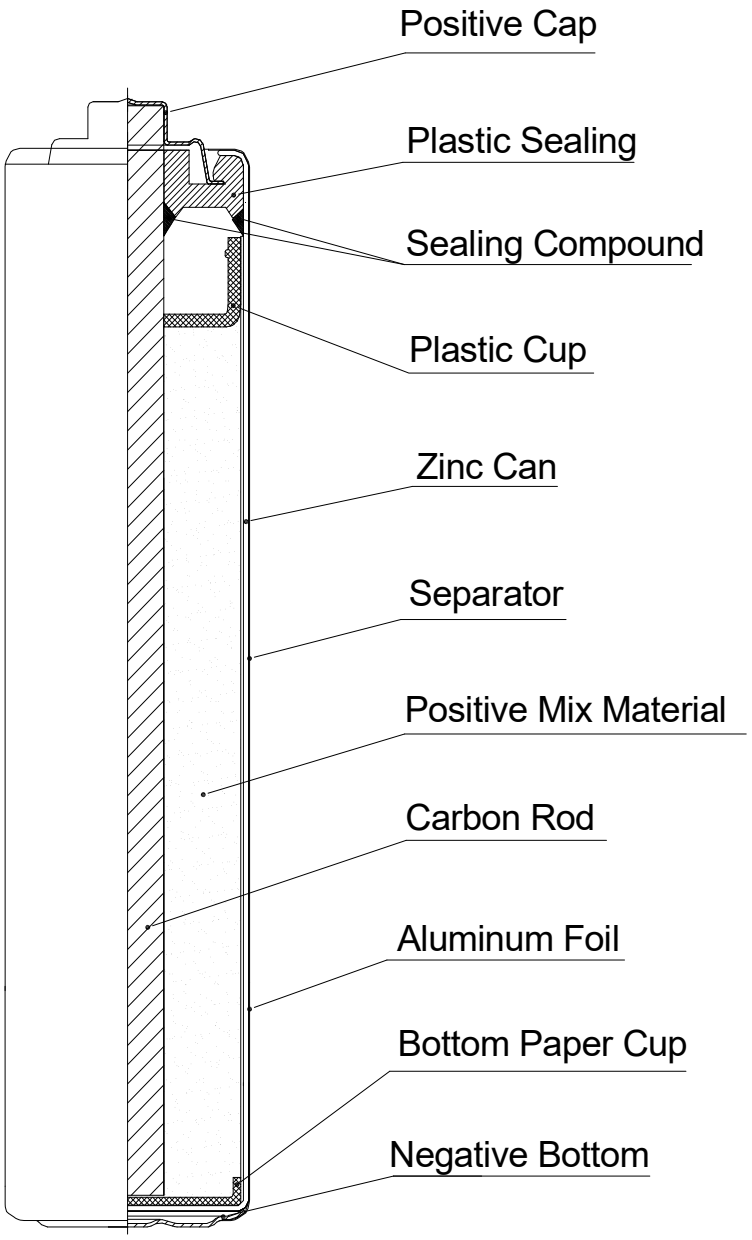
Shelf Life: 36 months after production under proper storage condition.

Expiry Date Marking: best before date are marked on the bottom of finished cell.

12. Battery Structure (Page 7)

13. Battery Dimension (Page 8)

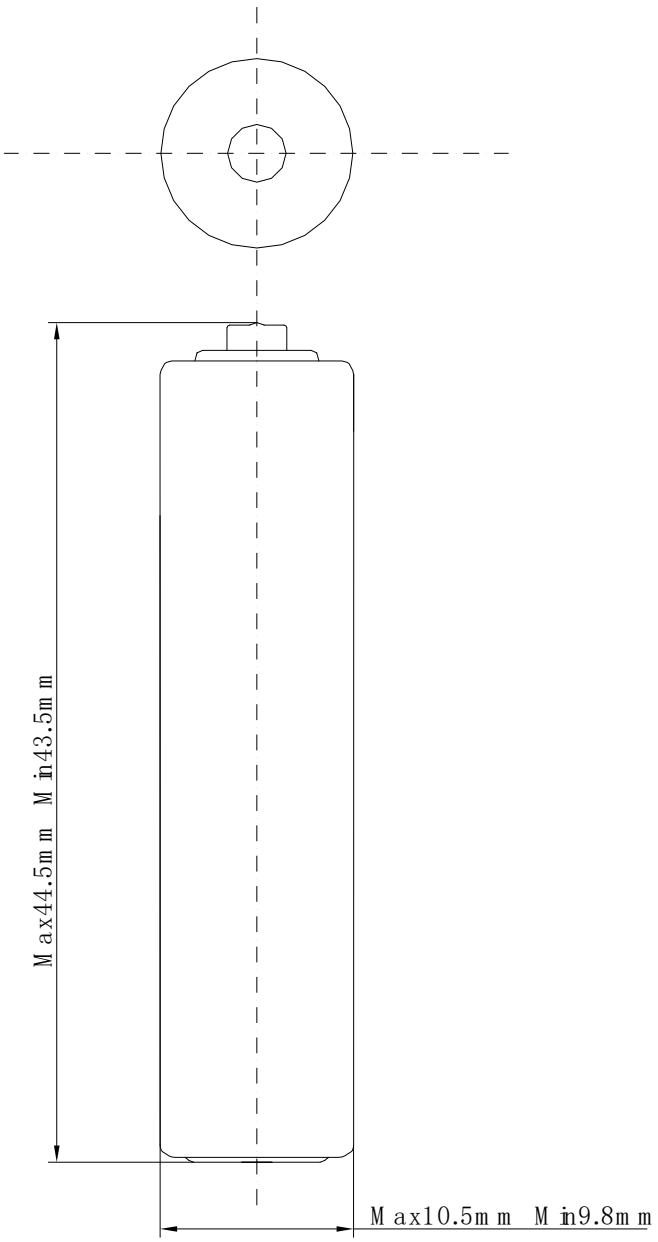
Battery Structure



Battery Structure

R03-Aluminum Foil-704

Battery Dimension



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