



Alkaline Manganese Dry Battery AM4/LR03

1. Scope

This specification is applicable to the “Vinergy®” brand Alkaline Manganese Mercury Free Dry Batteries supplied by CHUNG PAK BATTERY WORKS, LTD.

2. Technical Specification

2.1 Name (Designation) : AM4 (Mercury free)

(IEC Designation) : LR03

2.2 Dimensions:

Diameter : 10.5mm

Height : 44.5mm

2.3 Weight (approx) : 11.5g

2.4 Nominal voltage : 1.5V

2.5 Typical capacity : 1200 mAh at 75 Ω 4hrs/day (E.V.0.9V)

2.6 Typical duration : 510 min at 10Ω 1hrs/day (E.V.0.9V)

71 hrs at 75 Ω 4hrs/day (E.V.0.9V)

2.7 Retention : 90% after 12 months storage(20°C)

85% after 24 months storage(20°C)

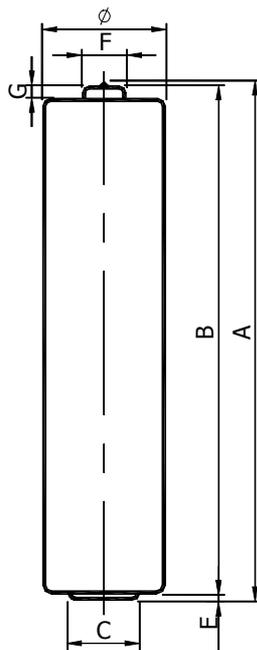
80% after 36 months storage(20°C)

2.8 Outside shape dimensions and terminals:

Dimensions of Alkaline Manganese Dry Battery LR03

unit:mm

	Max	Min
A	44.5	43.3
B		43.3
C		4.3
E	0.5	
F	3.8	
G		0.8
Ø	10.5	9.5



Remarks

A: Overall height of battery

B: Height between contact terminals without pip

C: Outer diameter of negative terminal Contact area

E: Depression of negative terminal from outer casing

F: Diameter of positive terminal within The specified projection height

G: Height of projected area of positive terminal, exclusive part

Ø: Diameter of battery

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3. Performance (For all test method, refer to Appendix 1)

3.1 Service out-put:

Load resistance	3.6Ω	10Ω	20Ω	75Ω
Discharge method	*	1hrs/day	24hrs/day	4hrs/day
End –point voltage	0.9V	0.9V	0.9V	0.9V
Initial duration	600 time	480 min	17.5 hrs	68.0 hrs
Duration (After 12 months storage)	550 time	430 min	16.0 hrs	62.0 hrs
Duration (After 24 months storage)	520 time	410 min	15.0 hrs	58.0 hrs
Duration (After 36 months storage)	480 time	385 min	14.0 hrs	54.5 hrs

*: 15 s on, 45 s off for 24h per day.

The word “initial” is applicable to the products elapsed one month or less after production , including those , to which tests have been started in less than three month after production.

3.2 Overdischarge electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

3.3 High temperature electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

3.4 Expiry date : 3 years after manufactured.

4. Brand and packaging

Both OEM and ODM orders are welcome. Any specific design and packaging requirements will be accommodated as required

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5. Safety instructions

Warning	Danger
Don't throw the batteries into fire or heat the batteries	This may cause the batteries to ignite or disrupt
Don't directly solder the batteries	This may damage their insulating tapes and protective installation
Don't use the batteries with the \oplus and the \ominus electrode inverse	This can damage the batteries for being over-charged or over-discharged, even may cause leakage, heat generation, disrupt, or ignition
Don't expose the batteries to water	This can cause heat generation or rust
Don't charge batteries	This may result in venting, leakage, explosion and/or possibly fire
Don't disassemble or damage the external tubes of the batteries or modify the batteries (stack-up batteries) etc.	This easily results in short-circuit, leakage, even ignition
Immediately stop using the batteries if leakage, discolor or etc. with them are detected	This may cause accidents to occur
Don't drop or strongly strike the batteries	This may result in leakage, heat generation, disrupt, even ignition
Be sure to use the batteries within a temperature range from 0°C to 40°C	Charge the batteries beyond the temperature range may cause leakage, heat, generation, impaired performance, and shortening of service life of the batteries
Don't use old batteries with new ones	This may cause short-circuit or heat generation
Don't use our batteries with any other type or brand of batteries	Mixed-matching of batteries may result in leakage, heat generation and bursting
Keep the batteries out of the reach of children	To avoid being swallowed. If swallowed, please see doctor immediately

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Appendix 1 : Test

1. Storage and test conditions for samples

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

2. Measuring instruments and devices

2.1 Voltmeter : The accuracy of the voltmeter shall be within 0.005V for each 1.5V.

The resistance of the measuring instrument shall be at least 10 times the discharge resistance but with a minimum of 1 M ohms per volt of the scale.

2.2 Load resistance : The load resistance shall include all of the external circuit, and its allowance shall be within $\pm 0.5\%$.

2.3 Caliper : The caliper shall be the one having precision of 0.05 millimeters or the one having the same or superior precision to this.

3. Test method

3.1 Dimensions : Measurements shall be made by use of the calipers.

3.2 Appearance : Examination shall be carried out by visual inspection.

3.3 Open-circuit voltage: Measurements shall be carried out before the start of discharge of the sample by use of the voltmeter.

3.4 Service output

Discharge start time: After leaving in an atmosphere at a temperature of $20\pm 2^{\circ}\text{C}$ for at least 8 hours or more.

Discharge temperature and humidity: $20\pm 2^{\circ}\text{C}$, $65\pm 20\%$.

Discharge method : As defined in 3.1. However discharge shall be effected for more than 5 days during 7 days and when discharge is made twice a day, an interval of 4 hours shall be elapsed between two discharges.

Discharge end-point: The instant when the closed-circuit voltage has reached below the end-point voltage (as defined in 3.1, Page 2).



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3.5 Overdischarge electrolyte leakage resistance

The following conditions shall be adopted for the test.

- (a) Discharge start point: After keeping at the temperature of $20\pm 2^{\circ}\text{C}$ for at least 8 hours or more
- (b) Test temperature and humidity: $20\pm 2^{\circ}\text{C}$, $65\pm 20\%$
- (c) Load resistance : $20\ \Omega$
- (d) Test method : Continuous discharge for 65hours .

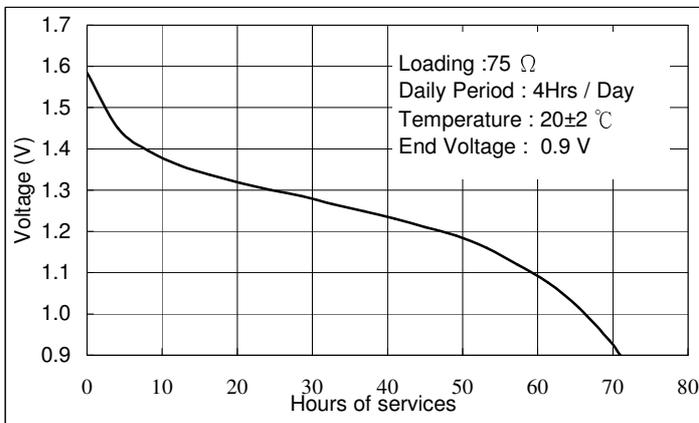
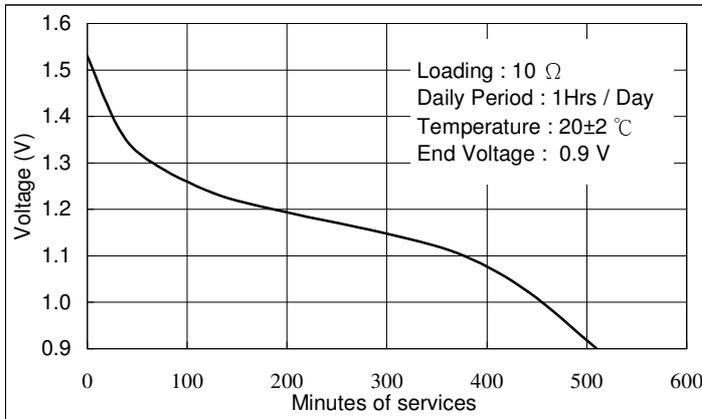
3.6 High temperature electrolyte leakage resistance

The following conditions shall be adopted for the test

- (a) Test temperature and humidity: $60\pm 2^{\circ}\text{C}$, $90\pm 5\%$
- (b) Test period : 20 days
- (c) Test method : Leave to stand still.

Appendix 2 : Discharge characteristics

SRANDARD DISCHARGE CURVE:



TEMPERATURE CHARACTERISTICS: (Discharge continuously at various resistance)

