

# Technology Specification

Model: LR03

Document No.: QTLR03-1



Version: QT2017-1

Date: 2017.01.01

## 1. Scope:

This specification defines the technical requirements for LR03 Alkaline battery supplied by Gigacell. If not otherwise specified, the technical requirements and dimensions for batteries should meet or exceed the requirements of GB/T 8897.1-2008, GB 8897.2-2008.

## 2. Reference documents:

2.1 GB8897.1-2008(IEC60086-1:2007,IDT) Primary batteries-Part 1:General

2.2 GB8897.2-2008(IEC60086-2:2007,MOD) Primary batteries-Part 2:Physical and technological specifications

2.3 GB8897.5-2006(IEC 60086-5:2005,MOD)Primary batteries-Part 5:Safety of batteries with aqueous electrolyte

## 3. Chemical systems , voltages and designation:

3.1 Chemical systems: Alkaline manganese battery  
Zinc-Manganese dioxide (Alkali metal hydroxide)

3.2 Nominal voltage: 1.5V

3.3 Designation: IEC&GB(China): LR03

ANSI: AAA

JIS: AM-4



## 4. Battery Weight and Capacity:

4.1 Battery Weight: Approximate 11.5g

4.2 Battery Capacity: Approximate 1200mAh (Test conditions: RH60 ± 15%, 20 ± 2 °C, 4h/d, end voltage:0.9V)

## 5. Heavy Metal Content

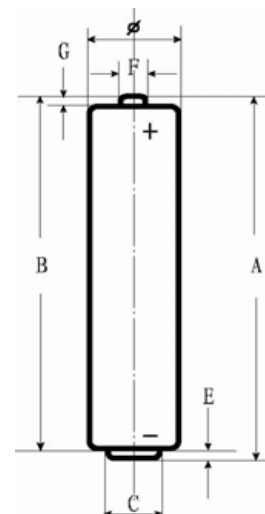
5.1 Mercury: max 1ppm

5.2 Cadmium: max 5ppm

5.3 Lead: max 5ppm

## 6. Dimension:

No.	Min(mm)	Max(mm)
Φ	10.1	10.4
A	43.9	44.3
B	43	44
C	6.0	6.5
E	0.1	0.5
F	3.2	3.6
G	0.9	1.3



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### 7. Voltage and Short Circuit Current: (3.9Ω, 0.3S, 20±2 °C)

Item	OCV (V)	CCV (V)	SCC(A)
Initial (3 months)	≥1.60	≥1.48	≥9
Storage 12 months	≥1.56	≥1.44	≥7

\*OCV measurement: The inner resistance of Voltage Metre is above 1MΩ, Accuracy should not be less than ± 0.25%, Accuracy should not be less than the last valid value 50%.

\*C.C.V. measurement: After 0.2±0.01sec by R=5.0Ω

\*SCC measurement: The pointer type ampere meter, the accuracy of ± 0.5%

### 8. Battery Performance:

Discharge Conditions			MAD (minimum average discharge time)	
Load	Discharge Mode	End Voltage (V)	Requirement of IEC 60086-2:2011	Our discharge
5.1Ω	4min/h, 8h/d	0.9V	130mins	240mins
24Ω	15s/h, 8h/d	1.0V	14.5hours	19hours
5.1Ω	1h/d	0.8V	2hours	4.1hours
75Ω	4h/d	0.9V	44hours	70hours
600mA	10s/min, 1h/d	0.9V	170 pulses	350 pulses
100mA	1h/d	0.9V	7hours	9.5hours
3.9Ω	24h/d	0.9V	/	140mins

\*Test condition: 20

°C ±2°C and 60 ±5% R

### 9. Leakage Resistance:

Item	Test Conditions	Sample size	Requirements	Acceptance
Over discharge	10Ω 24h/d for 48h at 20 °C ±2°C,	n=9pcs	No leakage; Max of 0.35 mm height increase	Ac=0,Re=1
High temperature and humidity storage	exposed to a temperature of 60 °C and RH90±5% for a period of 3 weeks.	n=20pcs	No leakage	Ac=0,Re=1

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45 °C Storage	stored for 12 weeks at 45 °C	n=20pcs	No leakage	Ac=0,Re=1
Item	Test Conditions	Sample size	Requirements	Acceptance
Partial Use	Stored at 45 °C 30days after undischarged batteries were test discharged 3.9Ω 24h/d,EPV=1.0V	n=5pcs	No leakage, No explosion	Ac=0,Re=1
Thermal shock	See the following note 1,Total 10 Cycles	n=5pcs	No explosion	Ac=0,Re=1
Incorrect installation	Place three undischarged and unconditioned batteries in a series with one test sample battery reversed,Complete the circuit until vent activation or until the temperature of the reversed battery returns to ambient.	n=5pcs	No explosion	Ac=0,Re=1
Free fall	Drop each undischarged battery Two times, oriented in each of three mutually perpendicular face (six total) from a height 1 meter,onto a concrete surface, see the following note 2	n=5pcs	No explosion	Ac=0,Re=1

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Over discharge	Discharge one test sample, battery(C1) with 43Ω resistance load until EPV is 0.6V,Connect three undischarged batteries and the sample battery in series with a 7.5Ω resistance load(R1)as shown in note 3,Maintain the circuit until the CCV of the series string reaches 2.4V	n=5pcs	No explosion	Ac=0,Re=1
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## 10. Inspection Rules:

10.1 Deliver inspection: Depending on GB2828

Number	Test	Item	IL	AQL
1	Dimensions	5	S-2	0.4
2	Appearance	--	II	1.0
3	Discharge capacity	7	--	--
4	Open-circuit voltage	6	II	1.0

Routine inspection: Depending on GB2829 and QB/T2389

## 11. Inspection for capacity:

11.1 9 samples shall be tested for capacity.

11.2 If the average value is equal to or more than the value of table 1, and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less. The batteries are considered to conform to the requirement.

11.3 If the average value is less than the value of table 1,or if the number of batteries showing a value less than 80% the value of table 1 is 2 or more, the test shall be repeated with other 9 pieces. At the second test, if the average value is equal to or more than the value of table 1,and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less, these batteries are considered to conform to the requirement.

11.4 At above second test, if the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% of the value of table 1 is 2 or more, the batteries are considered not to conform to the requirement. third test shall not be performed.

## 12.Instructions for use:

12.1 Always select correct size and grade of battery most suitable fot intended use.

12.2 Replace all batteries of a set at the same time.

12.3 Clean the battery contacts and also those of the equipment prior to battery installation.

12.4 Ensure that batteries are installed correctly with regard polarity(+ and -).

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12.5 Remove batteries from equipment which is not be used for an extend period of time.

12.6 Remove exhausted batteries promptly.

### 13.Display and storage:

13.1 Batteries shall be stored in well-ventilated dry and cool conditions.

13.2 Battery cartons should not be piled up in several layers,or should not exceed a specified height.

13.3 Batteries should not be exposed to direct sun ray for a long time or placed in areas where they get wet by rain.

13.4 Do not mix unpacked batteries so as to avoid mechanical damage and/or short circuit among each other.

### 14.Storage life:

Storage life of batteries is 5 years long at 20

°C  $\pm$  2°C and RH 60  $\pm$  5%

### 15.Marks:

15.1 Designation

15.2 Year and month of manufacture,which may be in code,or the expiration of a guarantee period in clear.

15.3 Polarity of terminals.

15.4 Nominal voltage.

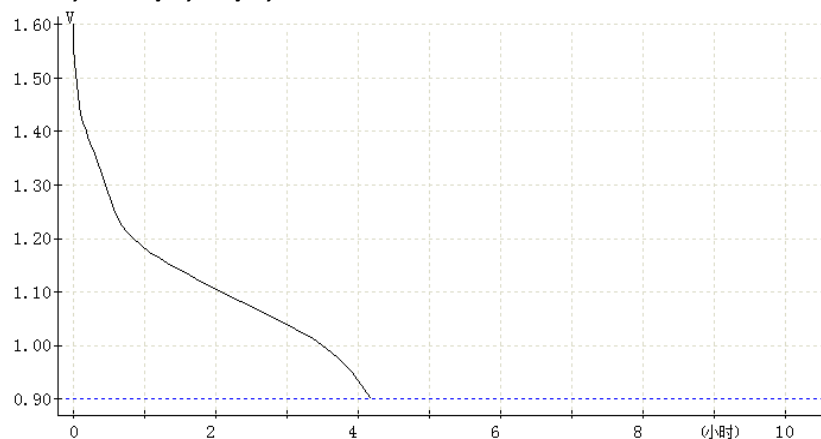
15.5 Heavy Metal content.

15.6 Name or trade mark or manufacturer and supplier.

15.7 Cautionary advice.

## 16 TYPICAL DISCHARGE CHARACTERISTICS

5.1Ω, 4min/h, 8h/d, e.v.:0.9V



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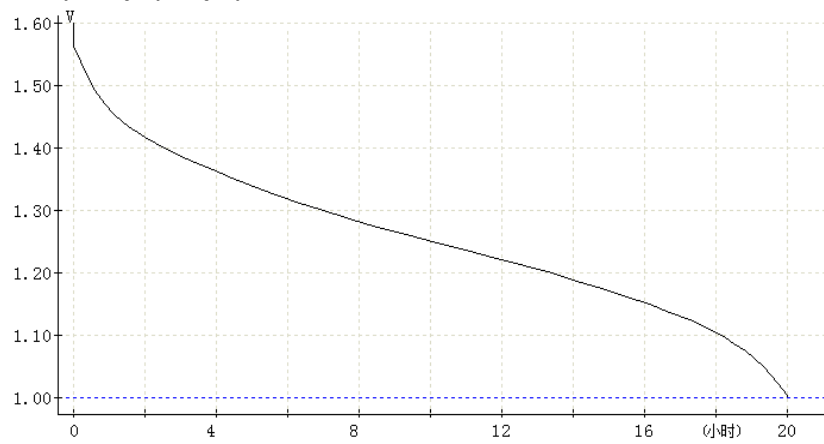
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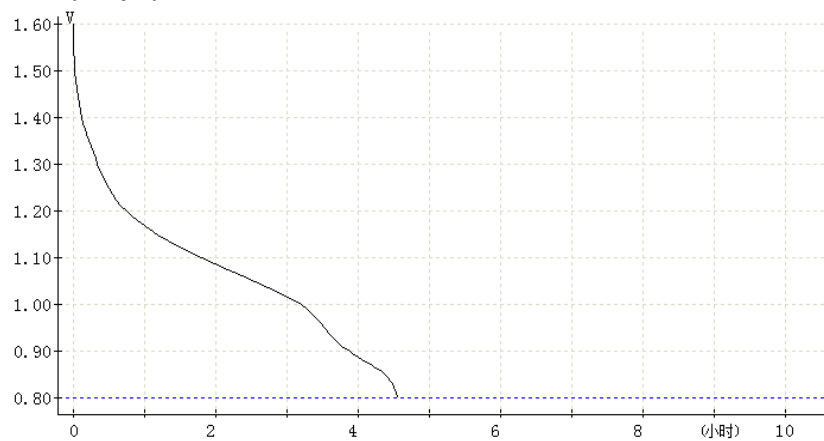
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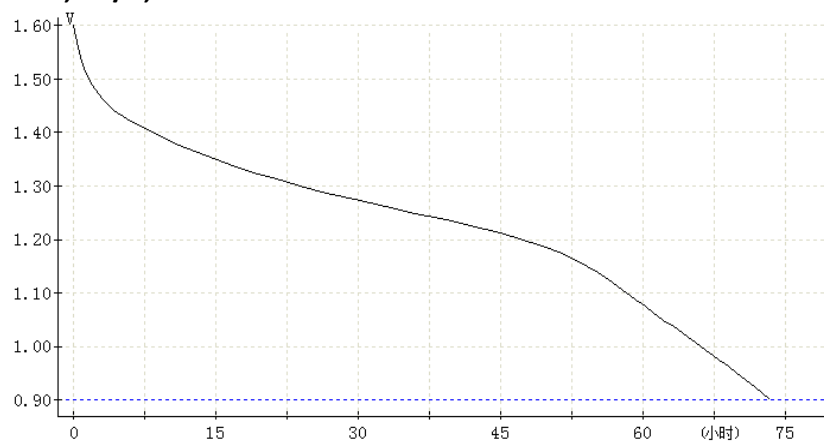
## 24Ω, 15s/h, 8h/d, e.v.:1.0V



## 5.1Ω, 1h/d, e.v.: 0.8V



## 75Ω, 4h/d, e.v.: 0.9V



## 600mAh, 10s/min, 1h/d, e.v.: 0.9V

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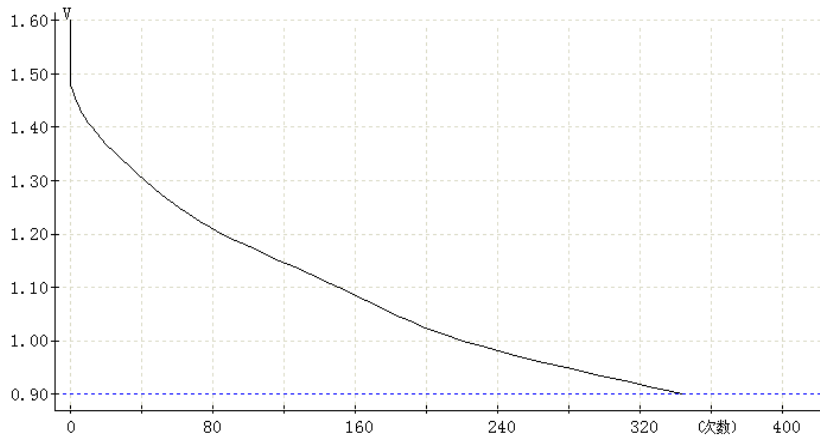
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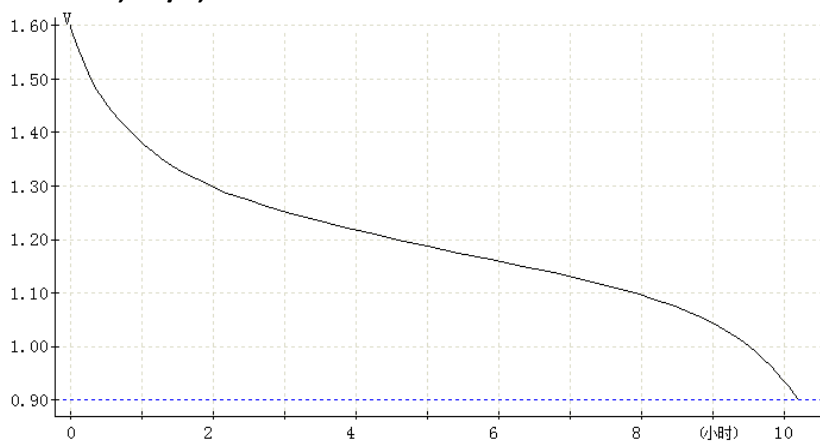


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## 100mAh, 1h/d, e.v.: 0.9V



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