

SPECIFICATIONS FOR

MSH-LR-09001-5

ALKALINE BATTERY

LR03(GD)E CH

APPROVED SIGNATURE :
YOUR NAME :
YOUR COMPANY NAME :
DATE :

In order to confirm your acceptance of this specification,  
Please return one copy signed by an appropriate authority.

**Notice ! Any order placed for the product's herein specified, after you have received this documents, will be taken as your acceptance of this specification.**

Approved : 山本智史

Issued Date : 2017-10-01

**maxell**

Maxell (Shanghai) Trading Co.,Ltd.

MSH-1710001

## 1. Scope

This specification is applicable to the batteries supplied by Maxell.

## 2. Type and characteristics

2.1 Name (Designation) : LR03(GD)  
(IEC Designation) : LR03

2.2 Nominal voltage : 1.5V

2.3 Standard product weight : 11g

2.4 Dimensions and terminals : In accordance with the appended drawing.

### 2.5 Characteristics

2.5.1: Open-circuit voltage : Values shall be satisfied with table 1.

2.5.2: Service output :Ditto

2.5.3: Electrolyte leakage resistance: Values shall be satisfied with table2.

2.5.4: Operating temperature : -20°C to + 60°C

2.5.5: Storage temperature : 20°C  $\pm$  2 °C

2.5.6: Others

Any specifications which this document does not specify are in  
Accordance with IEC 60086-2.

2.6 Expiry date :5 years after manufactured.

(Expiration of a recommended usage period is stated for the reasonable  
capacity remained)

### 2.7 Expiry of a recommended usage period representation

The expiration of a recommended usage period is represented by means of the  
following abridged notation on the surface of a battery.

Ex) 10-2022 (Manufactured in October ,2017)

### 2.8 Brand and package

The 'Maxell' brand shall be adopted as the product brand,  
Design and packing specification will be specified elsewhere.

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**Table 1 Open-circuit voltage and Service output**

Item	Condition					Performance	
	Atmosphere	Load resistance ( $\Omega$ )	Daily period	End-point Voltage (V)	Unit	Initial	After storage of 12 months and Expiration of a recommended usage period
Open-circuit voltage	20 $\pm$ 2 $^{\circ}$ C 55 $\pm$ 20%RH	-	-	-	V	Max.1.68 Min.1.50	Max.1.68 Min.1.50
Service Output		5.1	1)	0.9	min	130	117
		5.1	1h	0.8	min	120	108
		50mA	2)	0.9	h	12	10.8
		24	3)	1.0	h	14.5	13.1

1) 4 min on, 56 min off for 8h per day.

2) 1h on, 11h off for 24h per day.

3) 15s per min 8h per day.

**Table 2 :Electrolyte leakage resistance**

	Atmosphere	Condition	Performance
Over-discharge	20 $\pm$ 2 $^{\circ}$ C 55 $\pm$ 20%RH	Discharge condition is "Table 1" The discharge shall be continued until the closed circuit voltage drops for the first time below 40% of the normal voltage of the battery.	No deformation and no external electrolyte leakage shall be observed.
High temperature	45 $\pm$ 2 $^{\circ}$ C Below 70%RH	After 30 days storage (Which is equivalent to store at 20 $\pm$ 2 $^{\circ}$ C, 50% $\pm$ 20%RH for one year)	No deformation and no external electrolyte leakage shall be observed.

### 3. Guarantee period

The guarantee period shall be 12 months for shipping

✘Reject lot if inspection result is failed by initial inspection stated in sampling plan.

✘Exchange goods only for defected products after it passed initial inspection.

### 4. Indemnification

Please read attached " Safety Precaution of Alkaline Battery" very carefully before you handle the batteries.

Improper handle against the " Safety Precaution of Alkaline Battery" may not reach the standard of the characteristics. And we do not assume the responsibility for these improper handling, keeping beyond the specified storage condition and additional process on the original package.

## 5. Test

### 5.1 Storage and test conditions for samples

5.1.1 Storage conditions : Unless otherwise specified, the storage conditions for samples shall be kept, as a general rule, at the temperature of  $20 \pm 2^\circ\text{C}$  and the humidity of  $55 \pm 20\%$  RH. During short periods less than three months, the storage temperature may deviate from these limits without exceeding  $20 \pm 5^\circ\text{C}$ .

5.1.2 Test conditions : Unless otherwise specified, the most conditions for samples shall be kept at normal temperature ( $20 \pm 2^\circ\text{C}$ ) and normal humidity ( $55 \pm 20\%$  RH).

### 5.2 Measuring instruments and devices

5.2.1 Voltmeter : The accuracy of the voltmeter shall be within  $\pm 0.25\%$ . The resistance of measuring instrument shall be above  $1\text{M}\Omega$ .

5.2.2 Load resistance : The load resistance shall be included all of the external circuit, and its allowance shall be within  $\pm 0.25\%$ .

5.2.3 Caliper : The accuracy of caliper shall be within  $0.05\text{mm}$ .

### 5.3 Test method

5.3.1 Dimensions : Dimensions shall be measured by calipers defined in 5.2.3.

5.3.2 Terminal : Terminal shall be judged by visual inspection.

5.3.3 Appearance : Appearance shall be judged by visual inspection.

5.3.4 Open-circuit voltage : Open-circuit voltage shall be measured by the voltmeter defined in 5.2.1. The samples shall be left in the atmosphere at 5.1.2 test condition for 8 hours or more.

#### 5.3.3 Service output

(1) Preliminary : The samples shall be left in the atmosphere at 5.1.2 test condition for 8 hours or more.

(2) Discharge temperature and humidity :  $20 \pm 2^\circ\text{C}$ ,  $55 \pm 20\%$  RH

(3) Load resistance : In accordance with Table 1.

(4) Discharge method : In accordance with Table 1.

(5) Discharge end-time : When closed-circuit voltage reached for the first time below the end-point voltage defined in Table 1, it is defined as discharged end-time.

#### 5.3.6 Conformance check to a specified minimum average duration time

Average duration time of 5.3.5 service output must be more than characteristic value at table 1.

Average duration time calculate in the following procedure.

- (1) Test nine batteries
- (2) Calculate the average without the exclusion of any result.
- (3) If this average is equal to or greater than specified figure and no more than one battery has a service output of less than 80% of the specified figure, the batteries are considered to conform for service output.
- (4) If this average is less than the specified figure and/or more than one battery has a service output of less than 80% of the specified figure, repeat the test on another sample of nine batteries and calculate the average as previously.
- (5) If the average of this second test is equal to or greater than the specified figure and no more than one battery has a service output of less than 80% of the specified figure, the batteries are considered to conform for service output.
- (6) If the average of the second test is less than the specified figure and/or more than one battery has a service output of less than 80% of the specified figure, the batteries are considered not to conform and no further testing is permitted.

#### 5.3.7 Electrolyte leakage resistance

- (1) Over-discharge electrolyte leakage resistance

The following conditions shall be adapted to the test.

- (a) Discharge method: In accordance with 5.3.5 service output.
- (b) Discharge completion: In accordance with Table 2.

- (2) High temperature electrolyte leakage resistance

The following conditions shall be adapted to the test.

- (a) Test temperature and humidity : In accordance with Table 2.
- (b) Test period : In accordance with Table 2.

#### 6. RoHS directive

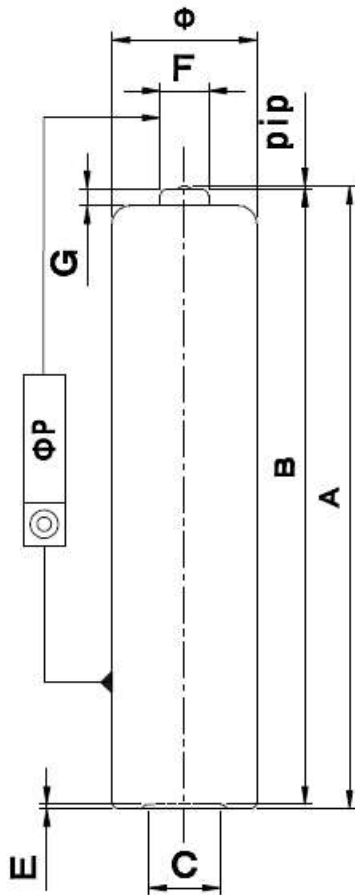
RoHS directive does not apply to Alkaline Battery.

For Alkaline Battery, the batteries Directive shall be applied without prejudice to other Directive in EU.

#### 7. Item on the agenda

If mistrust comes out about quality, the problem is solved by means of conference of both sides.

# Dimension of Battery LR03



	(mm)	
	MAX	MIN
<b>A</b>	44.5	(43.3)
<b>B</b>	—	43.3
<b>C</b>	—	4.3
<b>D</b>	—	—
<b>E</b>	0.5	—
<b>F</b>	3.8	(2.0)
<b>G</b>	—	0.8
pip	0.4	—
φ	10.5	9.5
φP	0.4	—

**Remarks**

- A: overall height of a battery
- B: height between two (2) contact terminals excluding pip
- C: outside diameter of the contact surface of negative terminal
- D: diameter of concave section in the center of negative terminal
- E: recess of negative terminal from outside cover
- F: diameter of the specified projection of positive terminal
- G: height from the flat highest projection (excluding pip) to the second highest position of a battery
- pip: below
- φ: diameter of a battery
- φP: the inclination degree of the wick of the positive terminal who faces on the side of the cylinder of the battery

# DRAWING SHEET OF OUTER DESIGN



SCALE : Free

TYPE

LR03

**maxell**

TITLE

MAXELL LR03(GD) E CH

## Safety Precaution of Alkaline Battery

Please follow the warnings and precautions listed below to avoid possible hazards from the improper use of Alkaline batteries and to ensure correct and safe use of them.

The following notes should be put in an appropriate and effective location in each end -use product and its instruction manual.

Failure to observe the following instructions may cause battery leakage ,heat generation ,explosion ,injury or damage of appliance.

### Danger

Alkaline Battery contains a strong alkaline aqueous solution (electrolyte).If any liquid from the battery comes out and contact with eyes, flush out with plenty of clean water immediately and consult a doctor to avoid loss of eyesight.

### Warning

- 1) Keep the battery out of reach of babies or small children. If the battery is swallowed, consult a doctor immediately.
- 2) If any alkaline aqueous solution of the battery is licked, gargle immediately and consult a doctor.
- 3) If any alkaline aqueous solution of the battery comes out and contact with skin or clothes, flush out with clean water immediately to avoid chemical burn.
- 4) Do not disassemble, heat or put the battery into a fire.
- 5) Do not short circuit with wire. Do not store with metal objects such as necklace and hairpin. It may occur leakage, heat generation or explode due to short circuit.
- 6) Do not install the battery in the appliance in reversed positive(+) and negative(-)terminal connection.
- 7) Charging of Alkaline Battery may cause electrolyte leakage or damage, because this type of battery is not designed as rechargeable battery.
- 8) Do not use the batteries mixed with new battery, old battery or different type battery.
- 9) Take out exhausted batteries promptly from the equipment. If batteries is left a long period, with connecting the exhausted battery to the equipment, it may occur leakage, heat generation, explode or damage of equipment due to gas generation inside of battery.
- 10) When not in use for a long time, take out the battery from the



appliance and store in a cool dry place.

#### Caution

- 1) Do not scratch or take off the outer label. It may occur leakage, heat generation or explode due to short circuit.
- 2) Please refer to handling instruction of equipment. If the battery is used in the complete sealed type equipment.
- 3) Do not solder the battery directly.
- 4) Do not leave or use the high temperature place such as in the car under blazing heat and direct rays. It may occur leakage, heat generation or explode.
- 5) Please avoid long term storage under these condition (direct rays, over 35°C, over high humidity ;75% R.H.).
- 6) In case of storage or throw away the batteries, insulate a terminal of the battery with a tape.
- 7) Do not expose the battery to rain or moisture.
- 8) Do not drop, give a strong impact like a throwing the battery.
- 9) Do not deform the battery.
- 10) Neither specification nor performance of battery may suit depending on usage or equipment. Please use suitable battery certainly according to handling instruction of equipment or warning.
- 11) This type of battery is to be thrown away as common nonflammable waste. When there are local laws or regulations, please discard according to the regulations.

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## Specification of Inspection

Maxell guarantees that the products supplied by us will satisfy this specification of the inspections. If the products do not meet this specification of inspections, Maxell shall immediately confirm the cause of the problem and shall take measure.

1. Quality Standard

In accordance with the product specification

2. Unit of Inspections

Once cell shall be one unit of inspection

3. Definition of Lot

In principle, a group of products, which are manufactured by the same production systems, and are with same lot code marking.

4. Test Method

In accordance with the product specification

5. Sampling Plan

In accordance with the table as below

And this is applied only to the initial test.

No.	Inspection Item	Inspection Level	Sampling Plan	Acceptable Quality Level	
1	Outside Diameter	n=9	Single	C=0	
2	Height Dimension	n=9	Single	C=0	
3	Open Circuit Voltage	n=20	Single	AQL=0.65	
4	Service Output	n=9	Single	AQL=0.65	
5	Appearance	Major Defect	n=20	Single	AQL=0.65
		Others	n=20	Single	AQL=0.65

Major Defect: Defect that functionally influences on characteristics of the products.

Others: Defect that is not categorized in Major Defect.

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