

## ► LR Micro Alkaline Batteries

### Outline of Products



#### ■ Product list

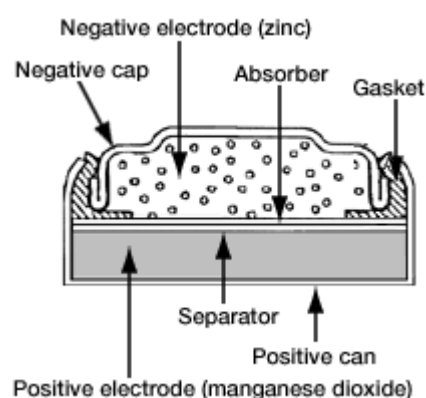
Model	Nominal Voltage (V)	Diameter (mm)	Height (mm)	Weight (g)
LR44	1.5	11.6	5.40	2.0
LR43	1.5	11.6	4.20	1.5
LR1130	1.5	11.6	3.05	1.1
LR1120	1.5	11.6	2.05	0.8
LR41	1.5	7.9	3.60	0.6
4LR44	6.0	13.0	25.20	10.5

- Data and dimensions are reference values only. For further details, please contact your nearest Maxell office.

#### ■ Outline

The Maxell's LR battery is a compact, light and economical alkaline battery having a nominal voltage of 1.5V. The LR battery is less expensive than silver oxide batteries and usable with a wide variety of equipment, ranging from electronic calculators to electric toys. Based on many years of experience and know-how in the field of silver oxide batteries, the LR battery boasts high quality and high reliability.

#### ■ Cross-sectional diagram



#### ■ Principle and reaction

The button-type alkaline battery uses manganese dioxide ( $\text{MnO}_2$ ) as its positive active material and zinc (Zn) as its negative active material. Potassium hydroxide (KOH) is used as an electrolyte.

#### Battery Reactions

**Positive reaction:**  $\text{MnO}_2 + \text{H}^+ + \text{e}^- \rightarrow \text{MnOOH}$

**Negative reaction:**  $\text{Zn} + 2\text{OH}^- \rightarrow \text{ZnO} + \text{H}_2\text{O} + 2\text{e}^-$

**Total reaction:**  $2\text{MnO}_2 + \text{H}_2\text{O} + \text{Zn} \rightarrow 2\text{MnOOH} + \text{ZnO}$

#### ■ Features

- Excellent cost-performance  
Unlike silver oxide batteries that use the precious metal, silver, the alkaline battery features good cost-performance because it uses low-cost manganese dioxide as its active material.
- Superior leakage\* resistance  
Like silver oxide batteries, the LR battery is manufactured using the Maxell's original leak-resistant processing that suppresses the electrolyte from rising up and seeping out — a basic phenomenon of alkaline electrolytes.
- Excellent heavy load characteristics  
The LR battery offers excellent heavy load characteristics and employs a separator featuring low internal resistance, good liquid holding properties and high-drain characteristics.

(\* Leakage is defined as an unintended escape of liquid from a battery.)

## ■ Applications

Mini-game machines, electronic calculators, electronic clocks, electronic watches, measuring instruments, electronic lighters, electronic thermometers, cameras, compact radios, and various types of remote controllers, etc.

## ■ Micro Battery Replacement Guide

Compatible-battery cross-reference chart

MICRO BATTERY Cross Reference and Replacement Guide						
System	Recommended Applications	Millimeters # x 10	inches # x 10	Nominal Voltage (V)	Max. Discharge Current (mA)	Typical Shelf Life (yr)
Watch High Drain	11.6 x 6.6	0.457 x 0.264	1.88	SR44SW	340	5
	11.6 x 6.2	0.457 x 0.248	1.85	SR43SW	340	5
	11.6 x 3.05	0.457 x 0.120	1.85	SR113SW	340	5
	11.6 x 2.05	0.457 x 0.081	1.85	SR1132SW	340	5
	11.6 x 1.65	0.457 x 0.065	1.85	SR1116SW	340	5
	9.0 x 5.8	0.354 x 0.232	1.42	SR40SW	340	5
	9.0 x 2.71	0.354 x 0.107	1.42	SR40SW	340	5
	9.0 x 2.05	0.354 x 0.081	1.42	SR40SW	340	5
	9.0 x 1.65	0.354 x 0.065	1.42	SR40SW	340	5
	7.0 x 5.8	0.276 x 0.232	1.09	SR44SW	340	5
	7.0 x 2.6	0.276 x 0.103	1.09	SR44SW	340	5
	7.0 x 2.0	0.276 x 0.079	1.09	SR44SW	340	5
	7.0 x 1.65	0.276 x 0.065	1.09	SR44SW	340	5
	7.0 x 1.65	0.276 x 0.065	1.09	SR44SW	340	5
	7.0 x 1.65	0.276 x 0.065	1.09	SR44SW	340	5

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## ■ Safety Instructions



— Handling

### • Never swallow

Always keep the battery out of the reach of young children to prevent it from being swallowed. If it is swallowed, consult a physician immediately.

### • Never touch the liquid leaked out of battery

The battery contains strong alkaline liquid, which is deleterious material. If the liquid comes into eyes, immediately flush eyes with plenty of water and consult a physician, because the alkaline liquid could cause becoming blind. If the liquid comes into mouth, immediately rinse by plenty of water and consult a physician. The alkaline liquid could also cause the skin irritation and/or chemical burns. If the liquid adheres to the skin or clothes, immediately flush it with plenty of water

### • Never short-circuit the battery

Do not allow the positive and negative terminals to short-circuit. Never carry or keep battery with metal goods such as a necklace or a hairpin. Otherwise battery could cause distortion, leakage, overheating, or explosion of the battery.

### • Never charge

The battery is not designed to be charged by any other electrical source. Charging could generate gas and internal short-circuiting, leading to distortion, leakage, overheating, or explosion.

### • Never expose to open flames

Exposing to flames could cause explosion of the battery.

### • Never heat

Heating the battery more than 100 degree centigrade could increase the internal pressure leading to distortion, leakage, overheating, or explosion.

### • Never disassemble or deform

Disassembly or deforming of the battery could cause the leakage, overheating, or explosion due to an internal short-circuits.



— Handling/Storage

### • Never reverse the positive and negative terminals when mounting

The improper mounting of the battery may lead to short-circuiting, charging or forced-discharging. This may cause distortion, leakage, overheating, or explosion.

### • Never short-circuit the battery while installing into equipment

On installing, the battery may be short-circuited via metal parts of the equipment. Please be careful on installing.

### • Never weld the terminal or wire to the body of the battery directly

The heat on welding such as soldering may cause distortion, leakage, overheating, or explosion of the battery.

### • Never use different batteries together

Using different batteries together, i.e. different type or used and new or different manufacturer may cause distortion, leakage, overheating, or explosion because of the differences in battery property.

### • Never leave the used battery in equipment

Long time leaving in the equipment may generate gas leading to distortion, leakage, overheating, or explosion and the equipment may be damaged.

- **Remove the battery from equipment while not in use for a long time**

Gas may be generated in the battery leading to leaking and damaging of the equipment.

- **Never treat the battery violently**

Strong shock by dropping or throwing may cause distortion, leakage, overheating, or explosion.

- **Use the correct battery suitable for the equipment**

The battery may not be suitable for the specific equipment due to the using conditions or type of equipment. Please select the suitable battery according to the handling instructions of the equipment.

- **Never use or leave the battery in hot place such as under the direct rays of the sun or in the car under the burning sun**

Otherwise this may cause distortion, leakage, overheating, or explosion of the battery.

- **Never store the battery in hot and high humid place**

Otherwise the property of the battery may deteriorate. Under certain circumstances, this may cause distortion, leakage, overheating, or explosion of the battery.

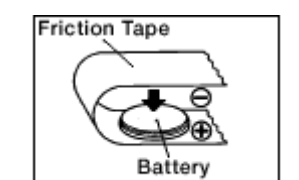
- **Never let the battery contact with water**

Contact of the battery with water may cause distortion, leakage, overheating, or explosion of the battery. And rust may be generated.



— Disposal

The battery may be regulated by national or local regulation. Please follow the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it may lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with friction tape or some other insulator before disposal.



(Example of battery insulation)

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