

# TECHNICAL INFORMATION

ALKALINE MANGANESE BATTERY

LR1

(Made in Indonesia)

February 19, 2014

BATTERY DIVISION  
QUALITY CONTROL DEPARTMENT

1. Type

LR1 (IEC : LR1, JIS : LR1)

2. Nominal value

(1) Nominal voltage : 1.5 volts

(2) Standard capacity : 900 mAh (300 Ω continuously discharge at 20°C,  
End point voltage = 0.9 volts)

3. Structure

Show Fig.1.

4. Dimension

Show Fig.2.

5. Electric characteristics

	Initial	After 1 year	After 2 years
Off-load voltage (V)	1.60	1.58	1.57
On-load voltage (V)	1.38	1.30	1.26
Short-circuit current (A)	3.4	2.6	2.4

1) Load resistance : 5 Ω (The resistance shall be adjusted within ±0.05%),  
Measure time : 0.3 seconds

2) Test temperature : 20 ± 2°C, Storage temperature : 20 ± 2°C.

6. Service out-put

(1) Average duration

Discharge condition		Initial	After 1 year	After 2 years
5.1 Ω 5min./day (min) EPV=0.9V	IEC,JIS	Above 94	Above 84	Above 84
	Normal	<b>145</b>	<b>125</b>	<b>119</b>
300 Ω 12hr./day (hr) EPV=0.9V	IEC,JIS	Above 130	Above 115	Above 115
	Normal	<b>230</b>	<b>225</b>	<b>220</b>

1) EPV : End point voltage

2) Test temperature : 20 ± 2°C, Storage temperature : 20 ± 2°C.

7. Electrolyte leakage proof characteristics

(1) Over-discharge test

Visual check at the time when the on-load voltage of test cell first decreases below 40% of the nominal voltage.

Discharge condition	n	Leakage
5.1 Ω 5min./day	n=9 × 5lots	none
300 Ω 12hr./day	n=9 × 5lots	none

(2) Storage at 45°C, below 70%RH

Period	n	10days	20days	30days	60days	90days
Leakage	40	none	none	none	none	none

(3) Storage at 60°C, 90%RH

Period	n	10days	20days	30days	40days
Leakage	40	none	none	none	none

8. Safety characteristics (abuse test)

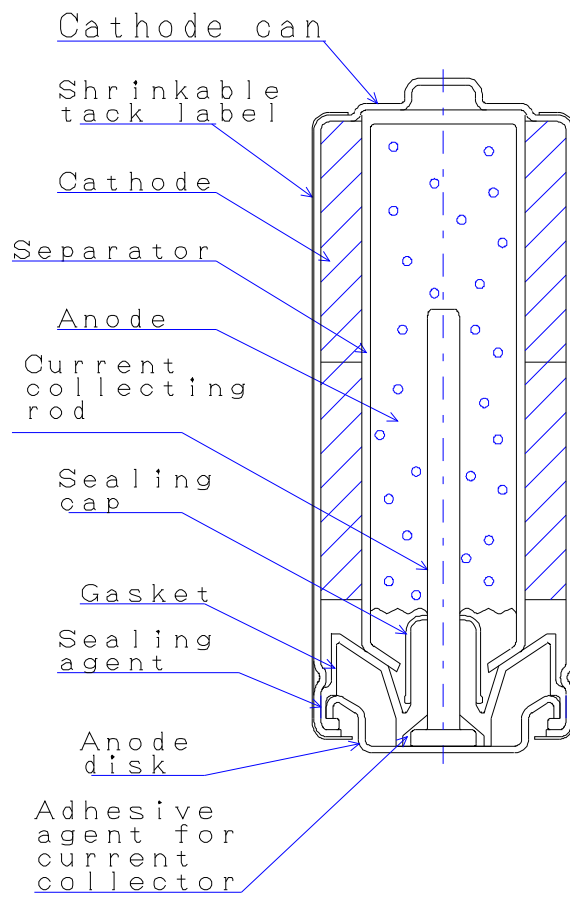
(1) Short circuit test

Shorted time	n	12hours	24hours
Explosion	20	none	none

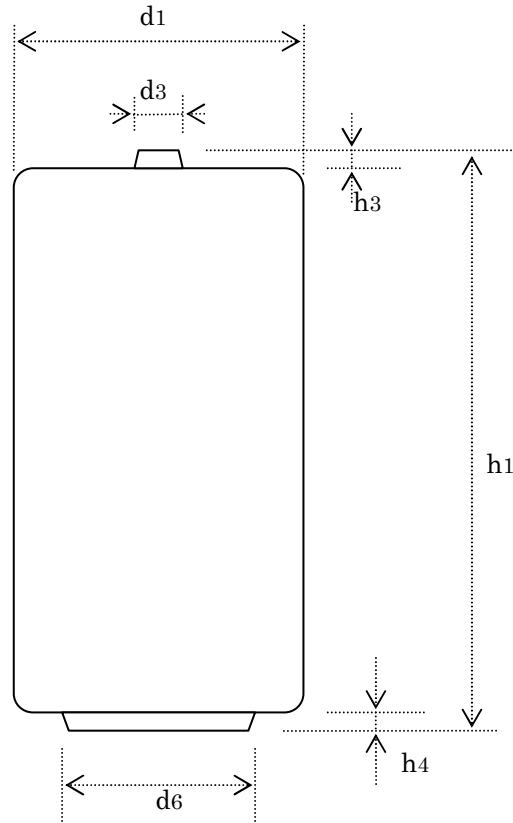
(2) Charging test (150mA)

Charging time	n	12hours	24hours
Explosion	20	none	none

Fig.1 LR1 STRUCTURE



**Fig.2 LR1 DIMENSION**



Unit : mm

$h_1$	Overall height	30.2 max. (29.1 min.)
$d_6$	Outer diameter of the negative contact area	5.0 min.
$h_4$	Recess of negative contact from enclosure	0.2 max.
$d_3$	Diameter of the positive contact	4.0 max. (2.0 min.)
$h_3$	Height of the projected flat contact from the next higher part	0.5 min.
$d_1$	Diameter	12.0 max. 10.9 min.

The numerical values in parentheses are informative reference values.