Performance Specification

Alkaline-Manganese Dioxide Battery

LR14 Size: C

1. Scope:

The purpose of this document is to specify the quality requirements for Hi-Watt battery produced with LR14 zinc-manganese alkaline battery.

2. Referenced Documents:

2.1 IEC publication 60086-1 Primary batteries --- Part 1 General.

2.2 IEC publication 60086-2 Primary batteries --- Part 2 Specification sheets.

2.3 ISO publication 2859-1:1999 / GB/T 2828.1-2003 Sampling plan and procedure for inspection by attribute; Method of sampling=General inspection levels Ⅱ.

3. Battery type and ratings:

3.1 Battery type:

Model	IEC	ANSI	JIS	NEDA
LR14	LR14	C	AM2	14A

3.2 Nominal Voltage: 1.5 V

3.3 Average weight: 70 g

3.4 Rated Capacity : 6000 mAh (at 6.8 Ω, 1H / D, Endpoint 0.9 V)

3.5 Operating temperature: -30℃~50℃

4. Physical Characteristics:

4.1 Dimensions:

Dimensional requirements are drawn from IEC publication 60086-2, unless otherwise indicated on the relevant supplement.

4.2 Appearance:

The products shall be free from dents, scratches, corrosion, contamination, or disfigurations, which affect service and saleability.

4.3 Date code:

Identify expiry date of the battery using Hi-Watt date coding 6 digits mark in the location of the

bottom of cell, the first two digits indicate month, others indicate year. Expiry date code for 5 years is used (e.g. a battery manufactured on Feb 2012 will carry an expiry code of 022017.)

5. Electrical Characteristics:

5.1 Environmental conditions

All electrical tests shall be conducted (in the sequence shown hereunder) at a temperature of 20 ± 2℃ with a relative humidity between 45% to75%, after stabilization under these condition for minimum period of 24 hours.

5.2 No-load voltage

The no-load voltage, measured under the conditions prescribes in 5.1. Voltage shall be carried out using a voltmeter with minimum input impedance of one megohm. The voltage shall be within the values specified.

Initial	12 months after manufactured
1.55~1.63 V	1.50~1.60 V

5.3 On-load voltage

5.3.1 On-load voltage measurement shall be conducted under the conditions prescribed in 5.1. Voltage measurement shall be carried out within 2±0.2 second of applying load.

5.3.2 The load resistor including all parts of the external circuit shall be within 0.5% of the value stated.

Initial	12 months after manufactured
Above 1.40 V	Above 1.35V

Load resistance: 5Ω ± 0.5％

5.4 Jacket insulation

No voltage reading is permitted between the jacket and either positive or negative terminal.

6. Service output:

6.1 To determine the service output, batteries shall be discharged through a fixed resistive load under conditions prescribed in 5.1 until the on-load voltage falls to the prescribed value (endpoint voltage).

6.2 Sample sizes for discharge test shall be in accordance with IEC Publication 60086-1 requirements.

6.3 Discharge loads, minimum average service lives, and endpoint shall be in accordance with those specified on relevant supplement.

6.4 Service Performance

Minimum Average Discharge Performance (Service time)	
3.9Ω, 1h/day, 0.8 V	18 hrs
6.8Ω, 1h/day, 0.9 V	33 hrs
20 Ω, 4h/day, 0.9 V	114 hrs
After 12 months storage	90 %

*Discharge curve see appendix 2

7. Leakage:

7.1 The delivered batteries stored under normal non-air conditioned environments shall not have electrolyte leakage during the guaranteed period.

7.2 When the batteries are discharged under the conditions specified load, until the on-load voltage falls to 0.6 V per cell, no leakage or deformation shall occur, in accordance with IEC Publication 60086-1 requirements.

7.3 For further leakage acceptance tests are to be agreed between HI-WATT and purchaser.

8. Marking:

Artwork for the batteries and packing shall conform to agree standard. This shall include as a minimum:

A) Designation;

B) The sign " + " shall be mark on or adjacent to positive terminal;

C) Nominal voltage;
D) Appropriate cautionary advice.

9. Acceptance criteria:

9.1Class 1,2,3 and 4

Defect classification	Critical	Major functional	Major	Minor
Class 1				
Live Jacket (Cl. 5.4)	×			
Polarity marking (Cl.8)	×			
Class 2				
No-load voltage (Cl.5.2)		×		
On-load voltage (Cl.5.3.2)		×		
Leakage		×		
Class 3				
Dimension (Cl.4.1)			×	
Major appearance defect (Cl.10.3)			×	
Class 4				
Minor appearance defect (Cl.10.4)				×

9.2 Class5

Defect classification	Sample size	Permitted failures
Service output	9	*
Leakage (Cl.7.2)	9	0

* Average service life shall be greater than or equal to the specified value. If this average is less than the specified value, a repeat test shall be made and a new average is calculated. If this average is still less than the specified value, the lot does not conform, and no further testing is permitted.

10. Defect classification:

10.1 Critical defect (AQL 0.15%)

A defect that analysis, judgment and experience indicate is likely result in hazardous or unsafe conditions for the user.

10.2 Major functional defect (AQL 0.25%)

A defect, other than a critical defect, that is likely to result in a failure, or to reduce materially the ability to use the cell/battery for its intended purpose.

10.3 Major appearance defect (AQL 0.65%)

A defect that is not likely to reduce materially the ability to use the cell/battery for it's intended purpose, or that is a departure from specification having little bearing on the effective performance of the cell/battery, but may reduce saleability of the cells/batteries.

10.4 Minor appearance defect (AQL2.5%)

Minor surface blemishes or scratches that are unlikely to reduce saleability of the cells/batteries

11. nvironmental requirements:

No mercury or cadmium may be added to the product or used during the manufacturing process.
The heavy metal limits as following:

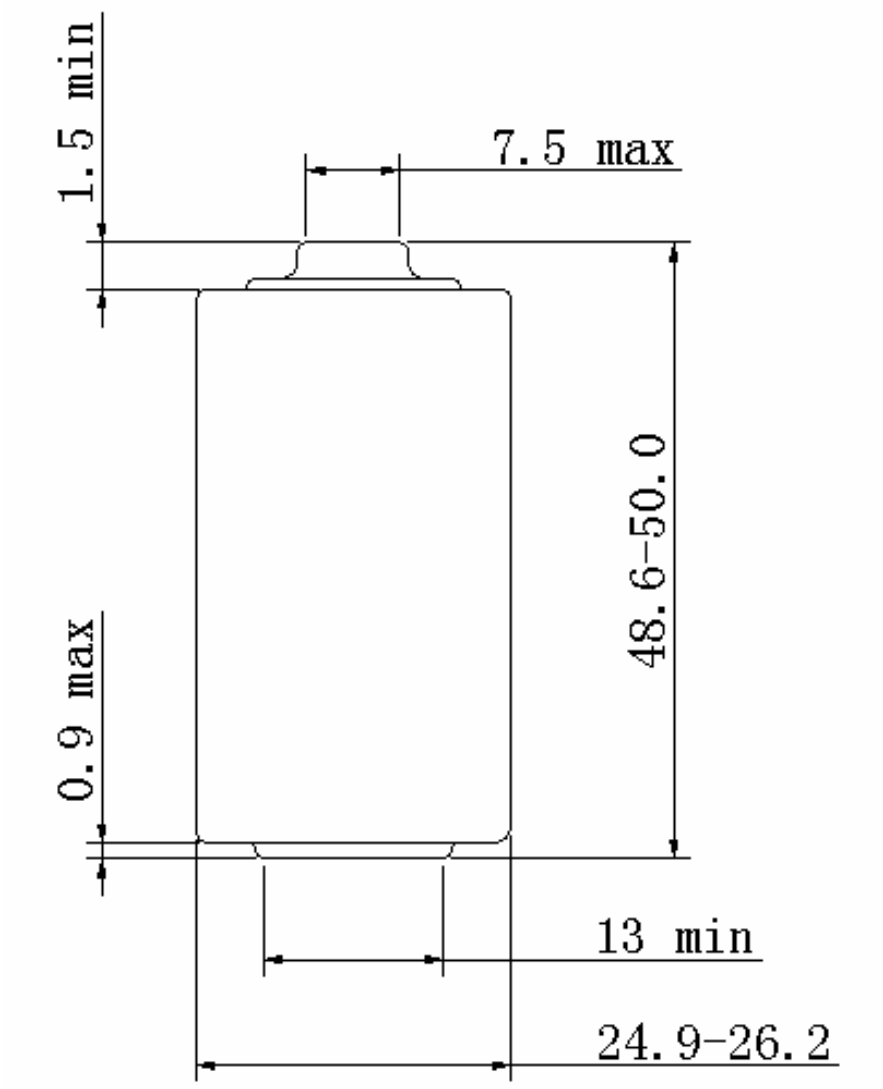
Mercury	max	1ppm / battery
Cadmium	max	5 ppm / battery
Lead	max	10 ppm / battery

12. Packing:

The packing must be adequate to avoid mechanical damage during transport, handling and stacking. The material and pack design must be chosen so as to prevent the development of unintentional conduction, corrosion of terminals and ingress of moisture.

Appendix 1:

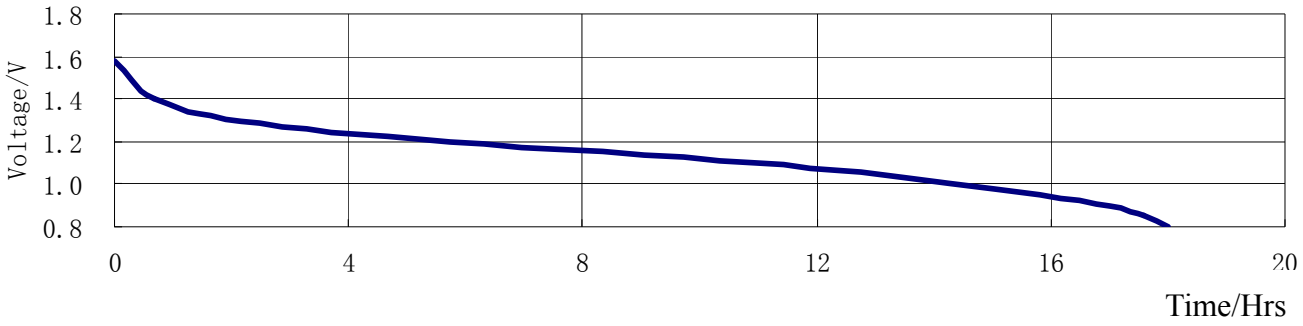
Dimensions



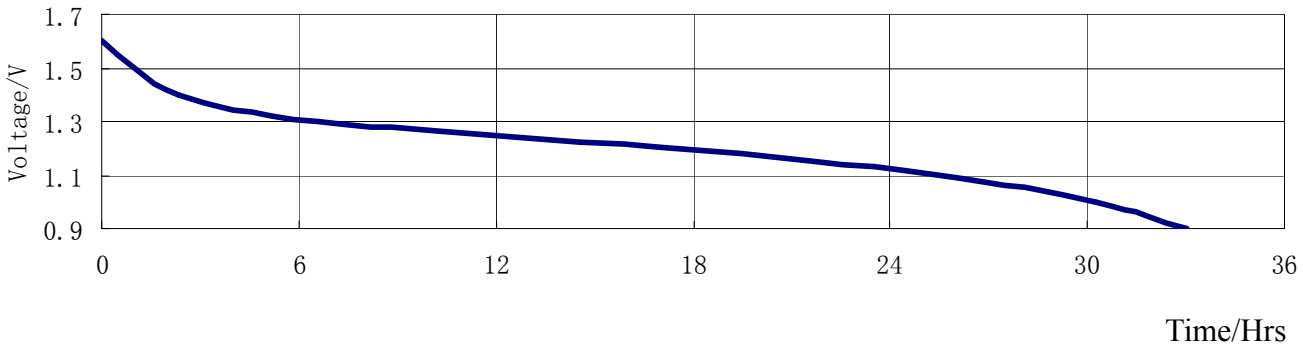
Appendix 2: (Test condition see section 6.4)

Discharge Curve

3.9Ω 1h/day 0.8V



6.8Ω 1h/day 0.9V



20Ω 4h/day 0.9V