
3LR12

Product specifications for cylindrical alkaline
battery



Approved by

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1. Scope:

The purpose of this document is to specify the quality requirements for Hi-Watt battery produced with 3LR12X zinc-manganese alkaline battery.

2. Referenced Documents:

- 2.1 IEC publication 86-1 Primary batteries --- Part 1 General.
- 2.2 IEC publication 86-2 Primary batteries--- Part 2 Specification sheets
- 2.3 IEC publication 410 Sampling plan and procedure for inspection by attribute.

3. Battery type and ratings:

3.1 Battery type:

Model	IEC	ANSI	JIS	NEDA
3LR12X	3LR12			

- 3.2 Nominal Voltage: 4.5 V
- 3.3 Average weight: 170 g
- 3.4 Rated Capacity : 4250 mAh (at 20 Ω , 1H / D, Endpoint 2.7 V)
- 3.5 Operating temperature: -30°C~50°C

4. Physical Characteristics:

4.1 Dimensions:

Dimensional requirements are drawn from IEC publication 82-6, unless otherwise indicated on the relevant supplement.

4.2 Appearance:

The products shall be free from dents, scratches, corrosion, contamination, or disfigurements, 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 July 1998 will carry an expiry code of 072003..

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5. Electrical Characteristics:

5.1 Environmental conditions

All electrical tests shall be conducted (in the sequence shown hereunder) at a temperature of

$20 \pm 2^{\circ}\text{C}$ with a relative humidity between 45% to 75%, after stabilization under these condition for minimum period of 24 hours.

5.2 No-load voltage

The no-load voltage, measured under the conditions prescribe 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
4.6-4.8 V	4.5-4.65 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 4.0 V	Above 3.8 V

Load resistance: $10\Omega \pm 0.5\%$

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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 86-1, 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)	Capacity
20Ω, 1h/day, 2.7 V	23 hrs	4250 mAh
220Ω, 4h/day, 2.7 V	350hrs	6000 mAh
After 12 months storage	90 %	

*Discharge curve see appendix 1

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 of specified load, until the on-load voltage falls to 0.6 V per single cell, no leakage or deformation shall occur, in accordance with IEC Publication 86-1 requirement

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.

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9. Acceptance criteria:

9.1 Class 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.

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10. Defect classification:

10.1 Critical defect (AQL 0.15%)

A defect that analysis, judgment and experience indicates 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 its 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 (AQL 2.5%)

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

11. Environmental 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

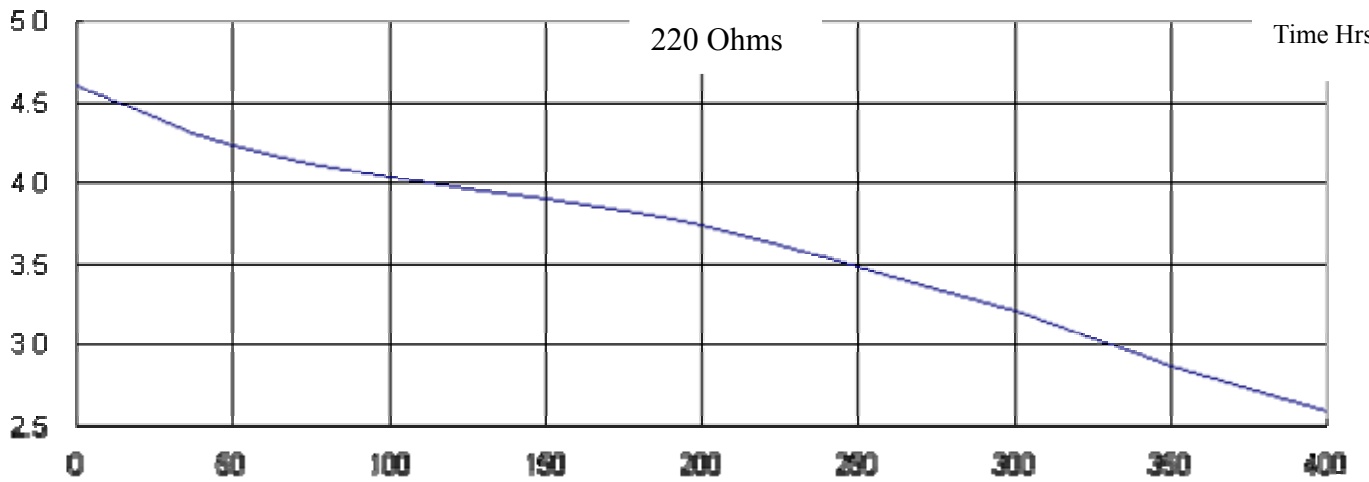
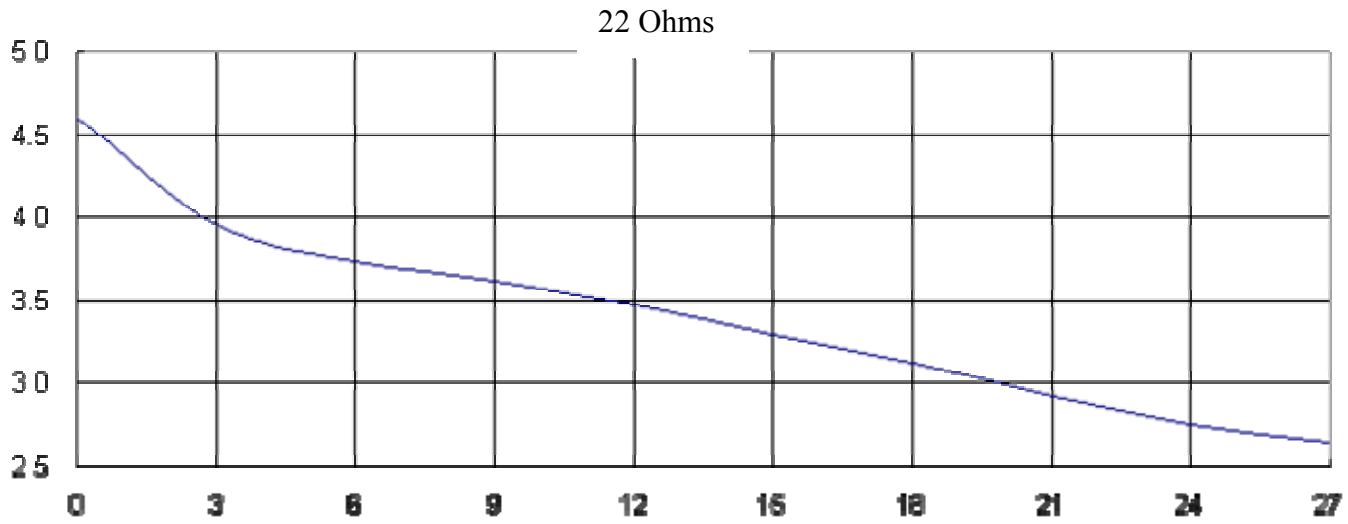
Lead max 10 ppm / battery

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.

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Appendix1: Discharge Curve of 3LR12X Battery



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Appendix2: Dimensions

