
DELIVERY SPECIFICATIONS

Chemistry: Alkaline Manganese Dioxide Battery

Model No.: HQ-ALK-D-01

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Customer comment:

Alkaline Battery

LR20/D

1. Scope

This specification governs the performance of the following Alkaline battery.
model: LR20/D.

1.1 Designations:

IEC : LR20

JIS : AM-1

ANSI : D

Others : E95

2.2 Reference Document:

- IEC 60086-1 (2000-11): Primary Batteries – Part 1: General
- IEC 60086-2 (2001-10): Primary Batteries – Part 2: Physical and Electrical specification
- IEC 60086-5 (2000-07): Primary Batteries – Part 5: Safety of batteries with aqueous electrolyte.

2. Ratings

Items	Specifications	Remarks
Nominal Voltage (V)	1.5	N/A
Nominal Capacity (Ah)	11.5	Condition: load 3.9Ω , 24 h/day, at $20\pm 2^\circ\text{C}$, RH $60\pm 15\%$, end point voltage 0.9V
Chemical System	Alkaline Manganese Dioxide	Mercury or cadmium is not added in the battery.
Applications Temperature ($^\circ\text{C}$)	-10 ~ 40	N/A
Typical Weight (g)	135	Approximate weight
Mechanical Dimensions	See attached Data Sheet	N/A

3. Electrical Characteristics

- Test conditions: -- load resistance $3.9\Omega\pm 0.5\%$,
-- measuring time 0.3 seconds,
-- temperature at $20\pm 2^\circ\text{C}$,
-- test carried out within 60 days after manufacture data.

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Test Items	Off-Load Volt (V)	On-Load Volt (V)	Flush Current (A)	Test Criterion
New Battery	1.60	1.45	10.00	ISO2859-1: 1999 Class S-4, Once Sampling, AQL = 1.0
After 3 months, at 45°C	1.56	1.40	8.00	
After 12 months at room temperature	1.56	1.40	8.00	

4. Service Output

Test conditions: -- temperature at $20\pm 2^{\circ}\text{C}$,

-- test to be carried out within 60 days after manufacture data.

Standard	Discharge Conditions			Average Minimum Discharge Time	
	Discharge load (Ω)	Discharge Time	E.P.V. (V)	New Battery	After 12 months at room temp
IEC	2.2	4min/h,8h/d	0.9	19.5 h	17.6 h
IEC	10	4h/d	0.9	110 h	99 h
IEC	2.2	1h/d	0.8	20 h	18 h
IEC	1.5	4min/15min,8h/d	0.9	12 h	10.8 h
Grundig	3.9	24h/d	0.9	36 h	32 h

Satisfaction Standard:

- 1) 9 pieces of battery will be tested for each discharging standard;
- 2) The result of the average discharging time from each discharging standard shall be equal to or more than the average minimum time requirement; no more than one battery has a service output less than 80% of the specified requirement.
- 3) One re-test is allowed to confirm the previous result.

5. Electrolyte Leakage Proof Characteristics

Item	Condition	Period	Requirement	Acceptance Standard
Over-discharge Characteristics	3.9Ω continuous discharge at temperature $20\pm 2^{\circ}\text{C}$; relative humidity: $60\pm 15\%$ RH	48 hours	There shall be no deformation exceeding the specified dimensions, nor leakage recognized by human eye.	N = 9: Ac = 0; Re = 1
Storage Characteristics	Storage at temperature $60\pm 2^{\circ}\text{C}$; relative humidity below 90% RH	20 days		N = 30: Ac = 1; Re = 2

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6. Safety Characteristics

Item	Condition	Period	Requirement	Acceptance Standard
Short-circuit Characteristics	At temperature $20\pm 2^{\circ}\text{C}$	24 hours	No explosion allowed	N = 5: Ac = 0; Re = 1
Incorrect Installation	4 pcs in series with 1 pc reverse polarized (IEC60086-5)	24 hrs or till battery casing temp reaches room temp	No explosion allowed.	N = 4 x 5: Ac = 0; Re = 1

7. Marking

The following markings will be printed, stamped or impressed on the body of battery:

- a) Designation: LR20/D
- b) Manufacture's name or abbreviation "" logo.
- c) Polarity: "+" and "-".

8. External Appearance

The battery shall be free from cracks, scars, breakage, rust, discoloration, leakage and deformation.

9. Shelf Life and Validity Date

3 years after manufactural under proper storage conditions (Temperature: $20\pm 2^{\circ}\text{C}$; Relative humidity: $60\pm 15\%$ RH).

Validity date is impressed at the bottom of battery.

10. Cautions for Use

1. Since the battery is not manufactured for recharging, there are risks of electrolyte leakage or causing damage to the device if the battery is charged.
2. The battery shall be installed with its "+" and "-" polarity in a correct position, otherwise may cause short-circuit.
3. Short-circuiting, heating, disposing of into fire or disassembling of battery is prohibited.
4. Battery can not be forced discharged, which leads to excess gassing and may result in bulging, leakage and de-crimping of cap.
5. New batteries and used ones can not be used at the same time. It is recommended to use the same brand when replacing batteries.
6. Exhausted batteries shall be removed from the compartment in order to prevent over-discharge, which may cause leakage and damage to the device.
7. Direct soldering is not allowed, or else it will damage the battery.
8. Battery are to be kept away from children. If swallowed, contact a physician at once.

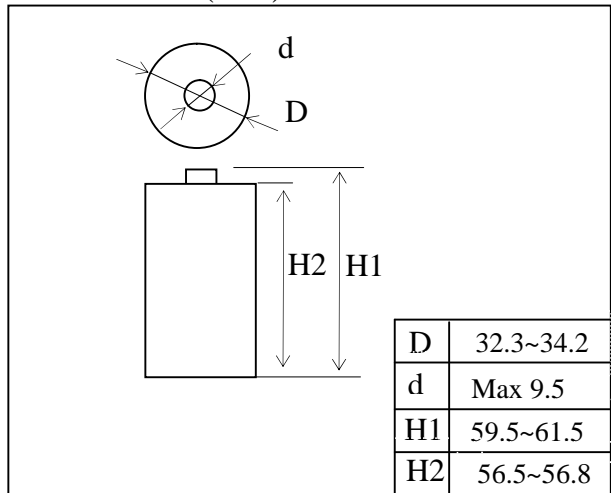
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Data Sheet

Nominal voltage	1.5V
Nominal capacity	11.5Ah
Standard load	3.9Ω
Standard discharge	Load 3.9Ω ,24h/d
End point voltage	0.9V
Operating temperature	-10~40°C
Weight	135g

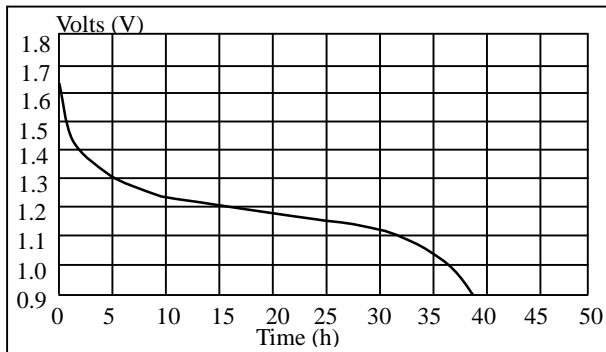
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Dimensions (mm)

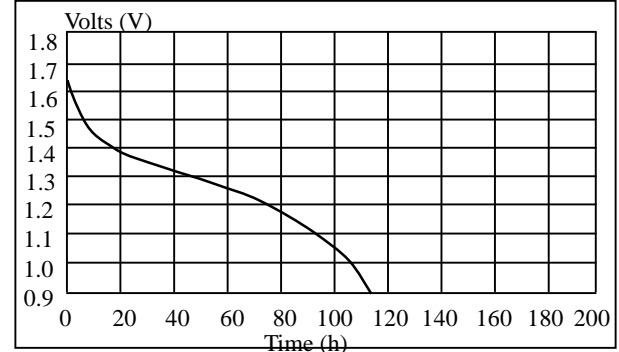


Discharge Characteristics (20±2°C, RH60±15%)

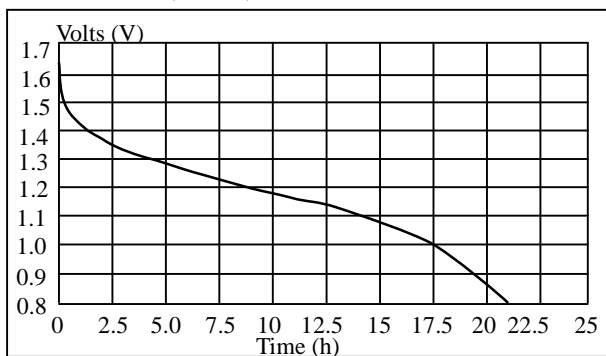
1. Load 3.9Ω ,24h/d, EPV 0.9V



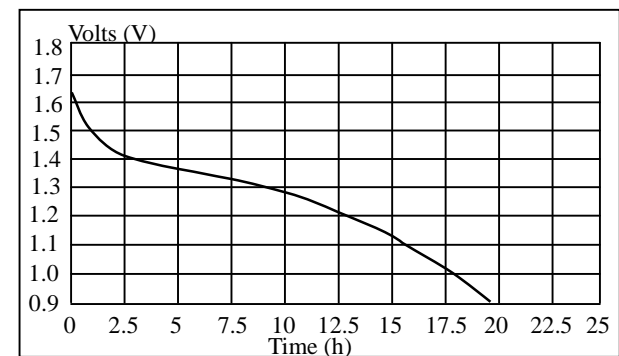
2. Load 10Ω ,4h/d, EPV 0.9V



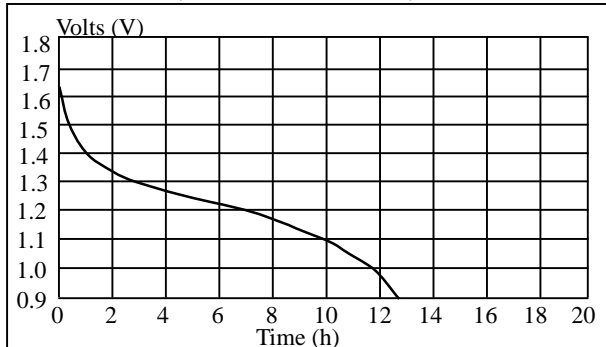
3. Load 2.2Ω ,1h/d, EPV 0.8V



4. Load 2.2Ω ,4min/h, 8h/d, EPV 0.9V



5. Load 1.5Ω ,4min/15min 8h/d, EPV 0.9V



All data contained herein is for single cell and may vary for cell with specific configuration, subject

to change without prior notice.