

Specification for GN24G Lead Free 1.5V R03 AAA size

Zinc Manganese dioxide Battery

Approved by Customer

Issued Date:

Approved by GP Batteries International Ltd.



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GP Batteries

Product Specifications

Model No.:GN24GLF

Document Number:GPBI-LB-S014-V00

Revision: 00

Page 2 of 8

Revision History

Revision No.	Revision Content	Issue Date
00	New released	13-Jun-2023

1. Applicability

This specification is applicable to GN24GBL (No Mercury, Cadmium & Lead added).

2. General

- 2.1 Type designation : R03(IEC/GB/JIS),24D(ANSI)
- 2.2 Nominal voltage : 1.5V
- 2.3 Chemical system : Zinc-Manganese dioxide(Zinc chloride)
- 2.4 Shape and dimension : Refer to Drawing 1.
- 2.5 Weight (reference) : 8.1g
- 2.6 Effective period : 36 months
- 2.7 Date code : MM-YYYY
(e.g. 07-2026 represents expiry date of July, 2026)
- 2.8 Jacket : Printed Tube

3. Appearance

There shall be no dirt, scratch or deformation detrimental to practical service in appearance.

4. Electrical Characteristics

4.1 Test method

- Method of sampling : ISO2859-1 Level II single sampling normal inspection.
- Voltmeter : Digital Voltmeter (DVM) with the precision of 1mV (internal resistance not less than 1 Megohm)
- Test temperature : 20±2°C

4.2 Open-circuit Voltage (OCV)

Initial	12 months	24 months
1.60~1.73V	1.55~1.73V	1.53~1.73V

4.3 Closed-circuit Voltage (CCV)

Initial	12 months	24 months
Above 1.50V	Above 1.45V	Above 1.41V

Load resistance: 15ohm ± 0.5% (measure time: 0.8 seconds)

*The initial OCV & CCV test shall commence within 60 days of manufacture, during 61 days ~12 months storage the OCV &CCV accept/reject according to 12 months, during13 ~24 months storage the OCV &CCV accept/reject according to 24 months. During this period, the cells shall be stored under room temperature conditions (20±5°C and 55+20/-40%RH).

5. Operating Temperature: 0°C to 45°C (60±20%RH)

GP Batteries

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Document Number:GPBI-LB-S014-V00

Revision: 00

Page 4 of 8

6. Storage Temperature: 10°C to 25°C (60±20%RH)

7. Service Output

7.1 Test method

- (1) The resistance of external discharge circuit shall be as specified plus or minus 0.5%.
- (2) The duration of discharge time periods shall be as specified plus or minus 1%.
- (3) Storage shall be at 20±5°C, 55+20/-40%RH and discharge tests shall be at 20±2°C, 55+20%/-40%RH.

7.2 Service Life

Discharge Items		EV	Standard	Initial		12Months	24Months	Application
				Typical	MAD	MAD	MAD	
15Ω Continuous		0.9V	-	270M	235M	210M	195M	Reference test
5.1Ω	4M/H-8H/D	0.9V	IEC60086	95M	80M	72M	67M	Portable lighting
5.1Ω	1H/D	0.8V	IEC60086	80M	68M	62M	56M	Toy
50mA	1H/12H-24H/D	0.9V	IEC60086	8.8H	8.0H	7.3H	6.7H	Digital audio
75Ω	4H/D	0.9V	IEC60086	28.0H	26.0H	24.0H	22.0H	Radio/Clock
24Ω	15S/M, 8H/D	1.0V	IEC60086	8.8H	8.0H	7.3H	6.7H	Remote control
S: Second M: Minute H: Hour D: Day EV: End-point Voltage MAD: Minimum Average Duration								

*The initial discharge test shall commence within 60 days of manufacture. The initial service life accept/reject according to initial MAD, during 61 days ~12 months storage the service life accept/reject according to 12 months MAD, during 13 ~24 months storage the service life accept/reject according to 24 months MAD. During this period, the cells shall be stored under room temperature conditions (20±5°C and 55+20%/-40%RH).

8. Electrolyte Leakage

	Test Items	Test Conditions	Requirements
8.1	Arrival at warehouse.	within two months after shipping	There shall be no leakage observed with the naked eye, and no bulging or deformation of batteries in excess of dimensions shown in the Drawing 1
8.2	Long term storage	Within 24 months of storing at 10°C to 25°C (60±20%RH)	
8.3	High Temperature	Test specimens shall be kept standing at 45±2°C and less than 70% RH for 30 days.	
8.4	Over-discharge	15Ω Continuous discharge until to EPV=0.6V (Test conditions:20±2°C and 55+20%/-40%RH)	

9. Quality Assurance

Description		Sampling Plan
Battery dimensions		AQL=0.25 (Note 4)
Appearance	Major defects (Rust etc.)	AQL=0.25 (Note 4)
	Minor defects (Scratch Stain etc.)	AQL=1.0 (Note 4)
Open-circuit Voltage (OCV)		AQL=0.65 (Note 4)
Closed-circuit Voltage (CCV)		AQL=1.0 (Note 4)
Service output		Note 1
Leakage 8.1		AQL=0.25(Note 4)
8.2		AQL=0.25(Note 4)
8.3		Note 2
8.4		Note 3

Note 1: Acceptance / rejection in accordance with IEC60086-1 Sub-clause 5.3.

- 1) Test eight batteries.
- 2) Calculate the average without the exclusion of any result.
- 3) If this average is equal to or greater than the specified figure and no more than one battery has a service output of less than 80% of the specified figure, the batteries are considered to conform for service output.
- 4) If this average is less than the specified figure and/or more than one battery has a service output of less than 80% of the specified figure, repeat the test on another sample of eight batteries and calculate the average as previously.
- 5) If the average of this second test is equal to or greater than the specified figure and no more than one battery has a service output of less than 80% of the specified figure, the batteries are considered to conform for service output.
- 6) If the average of second test is less than the specified figure and/or more than one battery has a service output of less than 80% of the specified figure, the batteries are considered not to conform and no further testing is permitted.

Note 2: Sample size: n=20

Judgement: Ac=1 Re=2

Note 3: Sample size: n=8

Judgement: Ac=0, Re=1

Note 4: AQL General Inspection level II, single sampling plan.

10. Content of heavy metal in battery

Mercury (Hg)	Cadmium (Cd)	Lead (Pb)
<0.0001%	<0.002%	<0.004%

11. Remark

Regarding the untouched items in this specification, please refer to IEC60086-1 & IEC60086 -2 & IEC60086-5

12. Packaging

12.1 Normal Packaging

1Pack(2pcs) → 1Inner-box(100Packs,200pcs) → 1Outer-box (5 Inner-Boxes,1000pcs)

12.2 Special Packaging

Packaging form shall be agreed by both parties.

13. Precaution & Handling

- 1) Do not disassemble or short-circuit batteries.
- 2) Do not recharge batteries.
- 3) Do not dispose of batteries in fire.
- 4) Do not allow metal objects to contact the battery terminals.
- 5) Do not mix with used or other battery type (such as alkaline with carbon zinc).
- 6) Do not solder the batteries directly. If soldering or welding connection to the battery is required, consult our engineer for proper methods.
- 7) Do not over-discharge batteries. Force discharging batteries by external power source in a series may cause explosion.
- 8) To install or remove batteries, follow the equipment manufacturer's instructions.
- 9) Keep battery away from small children. If swallowed, consult a physician at once.
- 10) Remove batteries from device when it is not in use. Exhausted batteries should be immediately removed from equipment and properly disposed of.
- 11) Do not heat batteries.
- 12) Do not encapsulate and/or modify batteries.

14. Storage

- 1) Store in a cool, dry place before use.
- 2) Do not leave the batteries in an atmosphere over the temperature of 30°C or over the relative humidity of 85% for a long time.
- 3) Battery cartons should not be piled up in several layers (or should not exceed a specified height).
- 4) Do not mix unpacked batteries so as to avoid mechanical damage and/or short-circuit among each other.

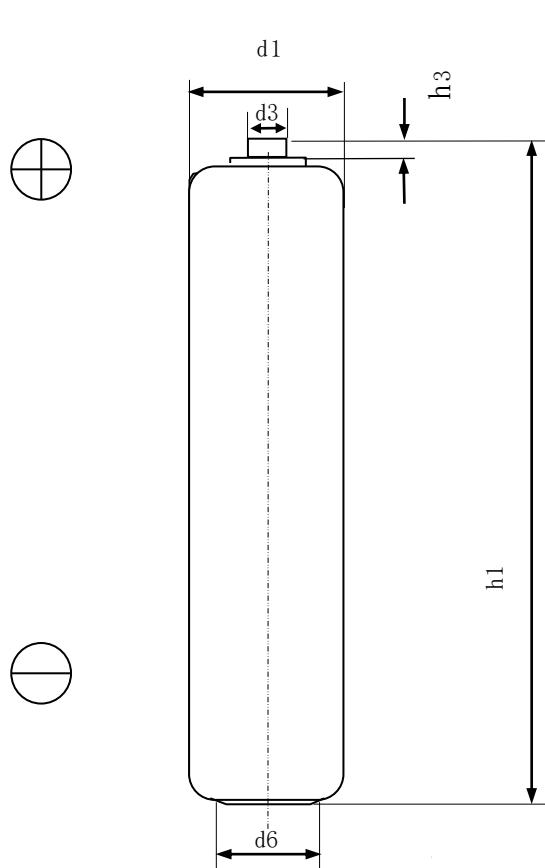
15. Instruction for use

- 1) Always select the correct size and grade of battery most suitable for the intended use. Information provided with the equipment to assist correct battery selection should be retained for reference.
- 2) Replace all batteries of a set at the same time.
- 3) Clean the battery contacts and also those of the equipment prior to battery installation.
- 4) Ensure that the batteries are installed correctly with regard to polarity (+ and -).
- 5) Remove batteries from equipment which is not to be used for an extended period of time.
- 6) Remove exhausted batteries promptly.

16. Reference Specifications (the latest edition of the referenced document applies)

- 16.1 IEC60086-1/GB/T 8897.1 Primary batteries part 1: General.
- 16.2 IEC60086-2/GB/T 8897.2 Primary batteries part 2: Physical and electrical specifications
- 16.3 IEC60086-5/GB 8897.5 Primary batteries part 5: Safety of batteries with aqueous electrolyte
- 16.4 ISO2859-1 Sampling procedures for inspection by attributes -- Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection
- 16.5 2006/66/EC: Eu Battery Directive

Shape and dimension



Unit: mm

Dimensions		R03
h1	max	44.5
	min	43.5
h3	min	0.8
d1	max	10.5
	min	9.8
d3	max	3.8
d6	min	4.3