

# GP Batteries

## Product Specifications

Model No.:GP24C

Document Number:C004

Revision: 0

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## 1. APPLICABILITY

This specification is applicable to Power Plus, GP24C (No mercury added).

## 2. GENERAL

2.1	Type designation	: R03 (IEC/JIS) / 24D (ANSI)
2.2	Nominal voltage	: 1.5V
2.3	Chemical system	: Zinc Chloride
2.4	Shape and dimension	: Refer to Drawing 1.
2.5	Weight (reference)	: 7.8g
2.6	Effective period	: 24 months
2.7	Date code	: MM-YYYY (e.g. 01-2012 represents expiry date of January 2012)
2.8	Jacket	: Printed Tube

## 3. APPEARANCE

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

## 4. CELL VOLTAGE

### 4.1 Test method

Method of sampling	: ISO2859-1:1999 Level II single sampling normal inspection.
Voltmeter	: The accuracy of the Voltmeter shall be $\leq 0.25\%$ and the precision shall be $\leq 50\%$ of the value of the last significant digit. The internal resistance of the Voltmeter shall be $\geq 1\text{M}\Omega$
Test temperature	: $20 \pm 2^\circ\text{C}$

### 4.2 Open-circuit Voltage (OCV)

Initial	12 months
1.60~1.725V	1.54~1.725V

### 4.3 Closed-circuit Voltage (CCV)

Initial	12 months
Above 1.50V	Above 1.44V

Load resistance :  $15\ \Omega \pm 0.5\%$  (measure time : 0.3 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. During this period, the cells shall be stored under room temperature conditions. ( $20 \pm 2^\circ\text{C}$  and  $60 \pm 15\%$  relative humidity)

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## 5. SERVICE OUTPUT

### 5.1 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  $20\pm 2^{\circ}\text{C}$ ,  $60\pm 15\%\text{RH}$  and discharge tests shall be at  $20\pm 2^{\circ}\text{C}$ ,  $60\pm 15\%\text{RH}$ .

### 5.2 Service Life

	Test Mode	Application	Standard	Initial		12 months	
				Typical	MAD	Typical	MAD
Service life at $20\pm 2^{\circ}\text{C}$	5.1Ω 4M/H, 8H/D (EPV=0.9V)	Portable lighting	IEC/ANSI	90M	70M	80M	60M
	10Ω 1H/D (EPV=0.9V)	Tape recorders	IEC/ANSI	2.7H	2.3H	2.6H	2.1H
	75Ω 4H/D (EPV=0.9V)	Radios	IEC	30.0H	25.0H	28.5H	23.0H
	24Ω 15S/M, 8H/D (EPV=1.0V)	Remote control	IEC/ANSI	9.0H	7.5H	8.0H	6.5H
	15Ω Continuous (EPV=0.9V)	Reference test		240M	200M	230M	190M

s: second M: minute H: hour D: day EPV: 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 this period, the cells shall be stored under room temperature conditions. ( $20\pm 2^{\circ}\text{C}$  and  $60\pm 15\%$  relative humidity)

5.3 Operating temperature:  $0^{\circ}\text{C}$  to  $45^{\circ}\text{C}$  ( $60\pm 20\%\text{RH}$ )

5.4 Storage temperature:  $-10^{\circ}\text{C}$  to  $25^{\circ}\text{C}$  ( $60\pm 20\%\text{RH}$ )

## 6. ELECTROLYTE LEAKAGE

	Test Items	Test Conditions	Requirements
6.1	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
6.2	Long term storage	Within 24 months of storing at $-10^{\circ}\text{C}$ to $25^{\circ}\text{C}$ ( $60\pm 20\%\text{RH}$ )	
6.3	High Temperature	Test specimens shall be kept standing at $45\pm 2^{\circ}\text{C}$ and 70% RH or less for 30 days.	
6.4	Over-discharge	15Ω Continuous discharge until to EPV=0.6V (Test conditions: $20\pm 2^{\circ}\text{C}$ and $60\pm 15\%\text{RH}$ )	

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## 7. 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=2.5 (Note 4)
Open-circuit Voltage (OCV)		AQL=0.65 (Note 4)
Closed-circuit Voltage (CCV)		AQL=1.0 (Note 4)
Service output		Note 1 (Note 4)
Leakage 6.1		AQL=0.25 (Note 4)
6.2		Note 2
6.3		Note 2
6.4		Note 3

Note 1 : Acceptance / rejection in accordance with IEC publication 60086-1 (2011), Sub-clause 5.3.

- 1) Test nine 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 nine 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=9

Judgement: Ac=0, Re=1

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

## 8. PACKAGING

Packaging form shall be agreed by both parties.

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## 9. 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 immediately from equipment which has ceased to function satisfactorily, or when not in use for a long period.

## 10. 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.

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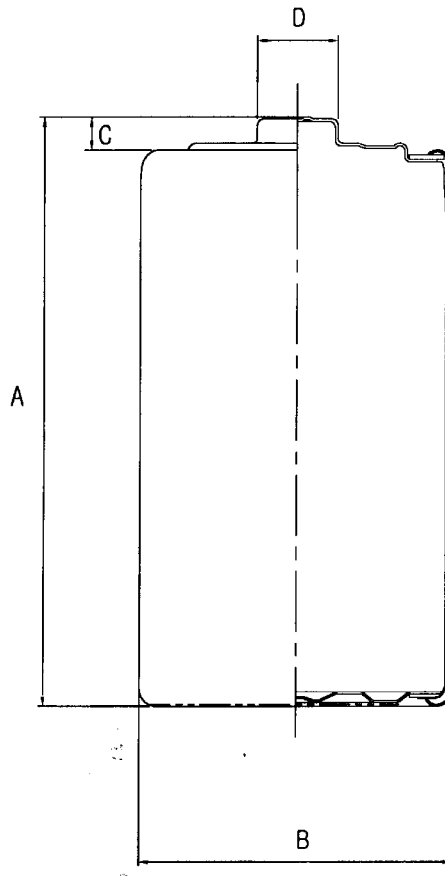
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**Drawing 1**



A	B	C	D
44.5 $\begin{matrix} +0.0 \\ -1.2 \end{matrix}$	$\varnothing$ 10.5 $\begin{matrix} +0.0 \\ -1.0 \end{matrix}$	MIN 0.8	MAX $\varnothing$ 3.8

Unit: mm