

# GP Batteries

## Product Specifications

Model No.:GPCR-V9

Document Number: P0007

Revision:08

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## 1. APPLICABILITY

This specification is applicable to GP Lithium Battery, GPCR-V9.

## 2. GENERAL

2.1	Type designation	: 1604LC (ANSI)
2.2	Nominal voltage	: 9V
2.3	Capacity	: 800mAh@10mA to 5.4V at 23°C
2.4	Shape and dimension	: Refer to Drawing 1.
2.5	Typical weight	: 34g
2.6	Operating temperature	: -40°C to +60°C
2.7	Shelf life	: 10 years at 20±2°C storage

## 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	: ANSI/ASQ Z1.4 level II single sampling normal inspection.
Voltmeter	: Digital Voltmeter (DVM) with the precision of 1mV (internal resistance not less than 1 Megaohm)
Test temperature	: 23°C

### 4.2 Off Load Voltage

At shipping	Within 12 months after manufactured
9.30V~10.2V	9.30V~10.2V

### 4.3 On Load Voltage

Initial	Within 12 months after manufactured
Above 8.50V	Above 8.50V

Load resistance: 150 ohm ± 0.5% (measure time: 1 second)

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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  $20\pm 2^{\circ}\text{C}$ ,  $55\pm 20\%\text{RH}$  and discharge tests shall be at  $20\pm 2^{\circ}\text{C}$ ,  $55\pm 20\%\text{RH}$ .

### 5.2 Service life

	Discharge	Initial (Nominal)	Initial (Minimum)	Within 12 months storage at 23°C (Nominal)	Within 12 months storage at 23°C (Minimum)
Service life at 23°C	600Ω 24H/D (EPV=5.4V)	56H	47H	55H	46H

s: second H: hour D: day

EPV: end point voltage

\*The initial discharge test shall commence within 30 days of manufacture. During this period, the cells shall be stored under room temperature conditions. ( $20\pm 2^{\circ}\text{C}$  and  $55\pm 20\%$  relative humidity)

## 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 naked eye and no bulging or deformation of batteries in excess of dimensions on shown in the Drawing 1
6.2	Long term storage	Within storage period of 12 months at $20\pm 15^{\circ}\text{C}$ , $55\pm 20\%\text{RH}$	
6.3	High Temperature	Test specimens shall be kept standing at $45\pm 2^{\circ}\text{C}$ and below 70% RH or less for 30days	

## 7. QUALITY ASSURANCE

DESCRIPTION	SAMPLING PLAN
Battery dimensions	0.65% (Note 5)
Appearance	1.0% (Note 5)
Off load voltage	0.65% (Note 5)
On load voltage	1.0% (Note 5)
Service output	Note 1 (Note 5)
Leakage 6.1	0.65% (Note 2 & 5)
6.2	Note 3
6.3	Note 4

Note 1 : Acceptance / rejection in accordance with IEC publication 60086-1(2015), 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 to 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 to service output.
- 6) If the average of the 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.
- 7) For the purposes of verifying compliance with this standard, conditional acceptance may be given after completion of the initial discharge tests.

Note 2: Leakage on arrival at warehouse is within two months after shipping.

Note 3: Sample size : n=20  
Judgement : Ac=1 Re=2

Note 4: Sample size :n=20  
Judgement :Ac=0, Re=1

Note 5: AQL General Inspection level II, single sampling plan.

## 8. RELIABILITY TEST

### 8.1 High Temperature Test

8.1.1 Store the cells in the temperature chamber at 60°C for 30 days, any defects should not be observed in appearance and dimensions.

8.1.2 Store the cells in the temperature chamber at 70°C for 10 days, any defects should not be observed in

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appearance and dimensions.

### 8.2 Low Temperature Test

Store the cells in the temperature chamber at  $-30^{\circ}\text{C}$  for 10 days, any defects should not be observed in appearance and dimensions.

### 8.3 Humidity Test

Store the cells in the temperature & humidity chamber at  $60^{\circ}\text{C}$ , 90%RH for 30 days, any defects should not be observed in appearance and dimensions.

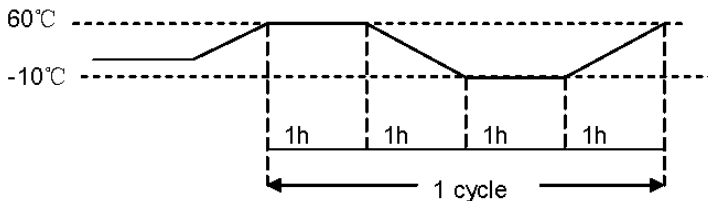
### 8.4 Drop Test

The batteries should withstand three drops from 75cm in any orientation onto an oak board.

Open circuit voltage should be kept over 9.30V.

### 8.5 Temperature Cycling Test

Store the cells in the temperature chamber at temperature cycling for 10 cycles, any defects should not be observed in appearance and dimensions.



## 9. PACKAGING

The printing on each cell label is legible and permanent. Label defects, if any, shall conform to mutually agreed upon limit samples.

- 9.1 Packaging for shipment and sales shall conform to the mutually agreed to Packaging Specification of .the designated customers.
- 9.2 The total of heavy metal lead, cadmium, mercury, and hexavalent chromium concentration shall not exceed 100 ppm in Packaging materials and printing inks. Ozone depleting substances (ODS) shall not be used in the manufacturing of any packaging.
- 9.3 It is recommended that packaging for shipment and sales according with Packaging Specification of GP CR-V9. For example, 1cell in a card, 30 cards in a display box, and 8 display boxes in a final outer carton. Flow chart as next page:

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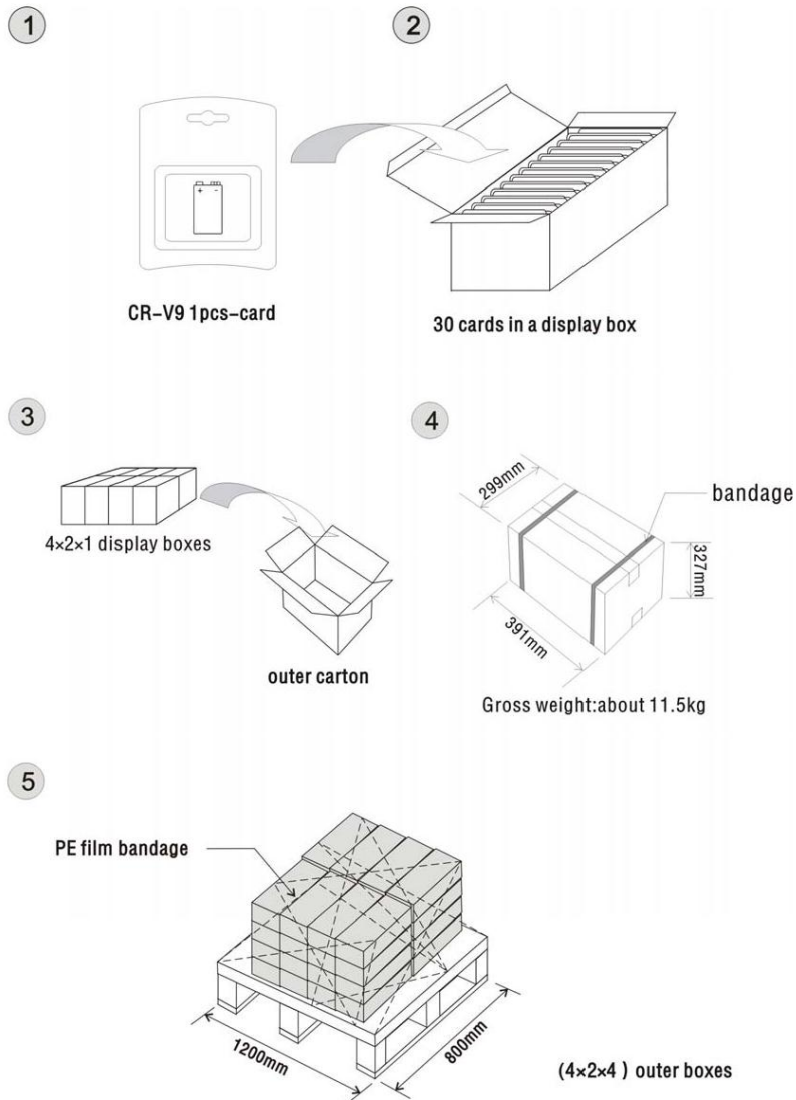
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### Example for SEA shipment only



9.4 Otherwise packaging for shipment and sales shall conform to the mutually agreed to Packaging Specification of the designated customers.

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## 10. LAW & REGULATION COMPLIANCES:

This product complies with EU's battery directive (2006/66/EC).

Packaging materials comply with EU's directive on packaging materials and waste (94/62/EC).

This product passes UN38.3 test.

This product complies with UL (BBET2:MH25972).

## 11. WARRANTY

One (1) year limited warranty against workmanship and material defects.

## 12. 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.

## 13. STORAGE

- 1) Store in a dry place that is not exposed to direct sunlight and rain.
- 2) Store at a temperature  $23\pm 2^{\circ}\text{C}$  (i.e. below  $25^{\circ}\text{C}$ ); and
- 3) Store at a relative humidity  $55\pm 20\%$  RH.
- 4) Stacking of pallets should be avoided at all time.
- 5) Careful handling of the batteries must be ensured at transportation and assembly, so to avoid any rupture or damage caused to the batteries.
- 6) To prevent damage to the safety vent inside the battery, do not impact or deform the batteries in any way.

## 14. Guidelines for designers of equipment using lithium batteries

- 1) When a lithium battery is used as main power source
  - 1.1 Select the most suitable battery for the equipment, taking note of its electrical characteristics.
  - 1.2 Number of batteries (series connection or parallel connection) to be used and method of use.
    - 1.2.1 Multi-cell batteries (2CR5, CR-P2, CR-V9 and others), one piece only;
    - 1.2.2 Cylindrical batteries (CR123A, CR2 and others), less than three pieces;
    - 1.2.3 When more than one battery is used, different types should not be used in the same battery compartment;  
When batteries are used in parallel, protection against charging should be provided.
  2. Design of battery circuit
    - 1.3.1 Battery circuit shall be isolated from any other power sources;
    - 1.3.2 Protective devices such as fuses shall be incorporated in the circuit.
- 2) When a lithium battery is used as back-up power source
  - 2.1 Design of battery circuit
    - 2.1.1 The battery should be used in separate circuit so that it is not force discharged or charged by the main power source.
  - 2.2 Design of battery circuit of memory back-up application
    - 2.2.1 When a battery is connected to the circuit of a main power source with the possibility of being charged, a protective circuit must be provided with a combination of diode and resistor.
- 3) Design of battery holder and battery compartment
  - 3.1 Battery compartment should be designed so that if a battery is reversed, open circuit is achieved;
  - 3.2 Battery compartments should be designed so that batteries other than the specified size cannot be inserted and made contact;
  - 3.3 Battery compartments should be designed to allow generated gases to escape. Battery compartments may be damaged when internal pressure of the battery becomes too high due to gas generation;
  - 3.4 Battery compartments should be designed to be waterproof;
  - 3.5 Battery compartments should be designed to be explosion proof when tightly sealed;
  - 3.6 Battery compartments should be isolated from heat generated by the equipment;
  - 3.7 Battery compartments should be designed so that they cannot easily be opened by children.
- 4) Design of contacts and terminals
  - 4.1 Material and shape of contacts and terminals should be selected so that effective electric contact is maintained;

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- 4.2 Auxiliary circuit should be designed to prevent reverse installation of batteries;
- 4.3 Contact and terminal should be designed to prevent reverse installation of batteries.
- 5) Indication of necessary precautions
  - 5.1 Orientation of batteries (polarity) should be clearly indicated at the battery compartment on the equipment;
  - 5.2 Precautions for the proper handling of batteries should be indicated in the instruction manual.



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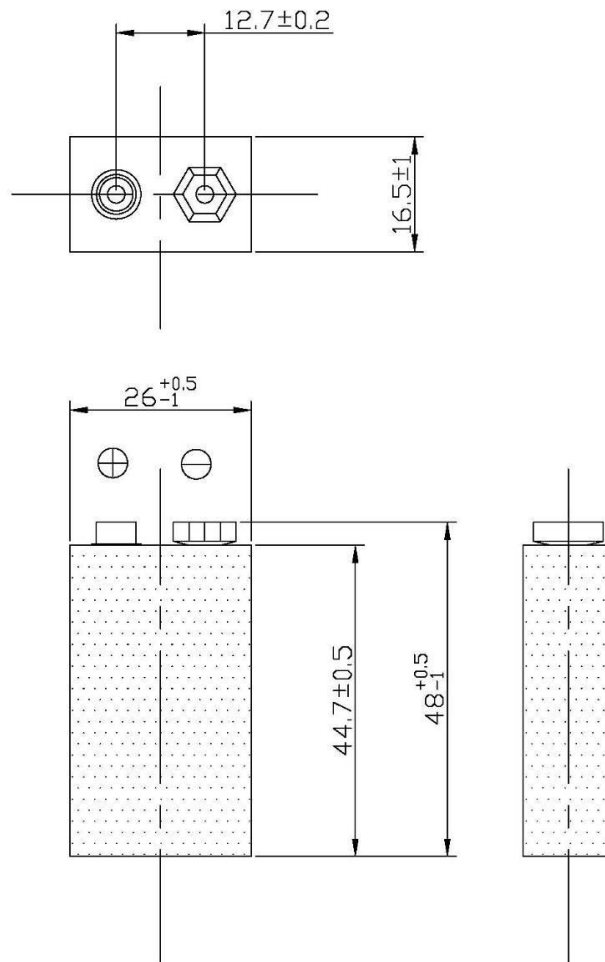
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Drawing 1



: LABEL AREA

Unit : mm