GP Batteries

Product Specifications ***Model No.:GP24LF***

1. APPLICABILITY

This specification is applicable to GP lithium/iron disulfide cell, GP24LF (No mercury added).

2. GENERAL

2.1	Type designation	: FR03 (IEC/JIS), 24LF (ANSI)
2.2	Nominal voltage	: 1.5V
2.3	Shape and dimension	: Refer to Drawing 1.
2.4	Typical weight	: 7.5g
2.5	Jacket	: Foil jacket
2.6	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	: MIL-STD-105E level II single sampling normal inspection.
Voltmeter	: Digital Voltmeter (DVM) with the precision of 1mV (internal resistance not less than 1 Megohm)
Test temperature	: 23±2°C

4.2 Off Load Voltage

At shipping	Within 12 months after manufactured
Above 1.7V	Above 1.62V

4.3 On Load Voltage

Initial	Within 12 months after manufactured
Above 1.7V	Above 1.62V

Load resistance : 50ohm ± 0.5% (measure time : 0.3 seconds)

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±2°C, 55±20%RH and discharge tests shall be at 23±2°C, 55±20%RH.

5.2 Service Life

	Test Mode	Application	Standard	Initial (Nominal)	Initial (MAD)	Within 12 months storage at 20°C (Nominal)
Service life at 23±2°C	600mA 24h/d (EPV=0.9V)	Reference	IEC/ANSI	115 mins	80 mins	105 mins
	1.2W/0.65W 2s/28s, 5min/h, 24h/d (EPV=1.05V)	Digital Camera	ANSI	170 Pulses	120 Pulses	140 Pulses
	400mW 4m/15m, 24h/d (EPV=1.0V)	Photo flash	IEC/ANSI	240 mins	140 mins	220 mins
	50mA 1h/12h,24h/d (EPV=0.9V)	Digital Audio	IEC/ANSI	25 hrs	18.6 hrs	24 hrs

s: second M: minute H: hour D: day W: Watt 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.
(23±2°C and 55±20% relative humidity)

5.3 Operating temperature: -30°C to 60°C (55±20%RH)

5.4 Storage temperature: not exceed 30°C (55±20%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 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 ±15°C, 55±20%RH	
6.3	High Temperature	Test specimens shall be kept standing at 60±2°C and below 70% RH or less for 20days	
6.4	Over-discharge	3.9Ω continuously discharge down to 0.6V at 23±2°C, 55±20%RH	

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
6.4	Note 4

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: 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. PACKAGING

Packaging shall be a form agreed by both parties.

9. WARRANTY

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

Precaution & Handling

1. Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
2. Keep away from children. If swallowed, contact a physician at once.
3. Do not mix GP batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.
4. Do not short circuit batteries, permanent damage to batteries may result.
5. Do not incinerate or mutilate batteries, may burst or release toxic material.
6. Do not solder directly to cells or batteries.
7. Store batteries in a cool dry place.
8. If find any noise, excessive temperature or leakage from a battery, please stop its use.
9. When not using a battery, disconnect it from the device.
10. Do not mix new batteries in use with semi-used batteries.
11. When find battery power down during use, please switch off the device and take batteries out.
12. Never put a battery into water or seawater.
13. Do not recharge batteries.
14.

Storage

1) Store in a dry place that is not exposed to direct sunlight and rain.
2) Store at a temperature 20 ± 15°C (i.e. below 35°C); and
3) Store at a relative humidity 55 ± 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.

Drawing 1