GUANGZHOU MARKYN BATTERY CO.,LTD

Battery Model No.: GMB-50A-1400mAh T 1.2V

These specifications apply to sealed Nickel-Metal Hydride Rechargeable Battery(GMB) of the above mentioned model.

Drw: _____

Exam: _____

App: _____

DATE: _____

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SPECIFICATIONS

Nominal(v)		1.2V
Capacity1*	Minimum Capacity	1300mAh
	Typical Capacity	1400mAh
size	long	50^{-1}mm
	diameter	$14.5^{-0.5}$mm
weight		About 29g
Internal Impedance		≤35mΩ
Charge	Charge	0.1Cto16hrs
	fast Charge	1Cto85min
1*: Discharge capacity when the sigle cell is discharged at 280 mA after being charged at 140 mA for 16 hours.		

Essential features:

1.APPLICATION

This specification applies to the Sealed Nickel-Metal hydride rechargeable cell or battery:

Model: 50A1400mAhT

2.RATINGS

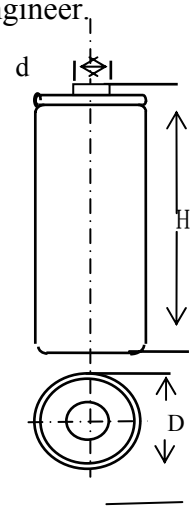
- Nominal Voltage 1.2 V
- Nominal 1400 mAh
- Standard charge rate 140 mA × 16h
- Rapid charge rate 1400 mA ×85min
  (stop when voltage reduce to 25mV)
  Value of dT/dt (for reference only) 1 to 2 ℃/min
  Trickle current 20 to 50 mA (Need timer)
- Discharge cut-off voltage (n × 1.0)V (n= 1--6)
  {(n-1) ×1.2}V (n=7--10) (n: cell number)
- Operating temperature range (Humidity: +65%± 20%)
  Standard charge 0 to +45℃(32 to 113℉)
  Rapid charge 10 to +45℃(32 to 104℉)
  Discharge -20 to +65℃(14 to 149℉)

- Storage temperature range (Humidity : +65%±20%)
  Within 1 year -20 to +35℃(-4 to 95℉)
  Within 6 months -20 to +45℃(-4 to 113℉)
  Within 1 month -20 to +55℃(-4 to 131℉)
  Within 1 week -20 to +65℃(-4 to 149℉)

*1. Rated capacity figures are based on single cell performance.

*2. All rapid charge systems should be discussed with our engineer.
*3. Battery quality guarantee period: 6 months.
When operation falls outside these parameters please contact our engineer.

3. SIZE AND SHAPE
Like the chart shows :



Diameter （D）	17.0-0.5mm
Highly （H）	50– 1mm
Diameter （d）	8.0±0.03mm

4. The sufficient electric discharge diagram of curves (see Figure 2)

5.PERFORMANCE

5-1. TEST CONDITIONS
All tests are carried out on new cell or batteries. (Within one month after delivery)
Ambient conditions:
Temperature +20℃±5℃
Humidity +65%±20%

5-2. TEST APPLIANCES

5-2-1. Voltage meter:
0.5 level or higher as required in IEC51/IEC485. Internal impedance exceeds 10KΩ/V.

5-2-2.Current meter:
0.5 level or higher as required in IEC51/IEC485. Internal impedance should be less than 0.01Ω/V(including wires).

5-2-3. Micrometer caliper:
With precision of 0.02mm.

5-2-4. Internal impedance meter:
Alternating current of 1000HZ, connector measuring equipment with sin wave of 4.

5-2-5: Impedance loaded meter:
Value of impedance is with ±5% error allowed (including external wires).

5-3. TEST METHOD & PERFORMANCE

Test	Conditions	Specification
Exterior packaging	naked eye test。	visual batteries should be no commercial value will reduce its flaws, such as stains, deformation, and scratches.
Open Circuit Voltage (OCV)	Within l hour after standard Charge	≥ 1.25V
Capacity	Standard Charge Discharge	≥ 100%

Internal Impedance	Upon.fully.charge, At 20°C environment testing	≤ 35 mΩ
Discharge Standards	The standard charge, the shelving of 30 minutes, 0.2 C discharge to 1.0 V	Discharge time≥300min
weight	Using disk-measurement scales	29 g
Rapid discharge	Fast-charge, the shelving of 30 minutes, 1.0 C discharge to 1.0 V	Discharge time≥54 min
Low-temperature discharge	20 ° C under standard charge, 0 ℃ 0.2 C discharge to 1.0 V / cell	Discharge capacity≥ Nominal capacity of 60%
High-temperature charge and dischar	50 ° -70 ° C under 0.1 C rechargeable 16 H, - Δ V = 10mV/cell, 50 ° -70 ° C under 0.2 C discharge standards	Discharge capacity≥ Nominal capacity of 40%
Overcharge	140mA(0.1C)Charge 28 days	Discharge capacity≥ Nominal capacity of 60%
Constant hot and humid Performance	Fully charged at 1400（1C) mA for 85min at 33 ±3℃、80±5%R.H， stand for 14 days.	No leakage nor deformation
Vibration Resistance	Charge the cell 0.1C 16hrs,then leave for 24hrs,check Cell before/after vibration, Amplitude 1.5mm Vibration 3000 CPM Any direction for 60mins.	Change of voltage should be under 0.02V/ Cell, Change of impedance should be under 5 mΩ / Ce
Impact Resistance	Charge the cell 0.1C 16hrs， Then leave for24hrs,checkbat-before/after dropped, Height 150cm Wooden board (thickness 10mm) Direction not specified, 3 timem）	Change of voltage should be under 0.02V/ Cell Change of impedance should be under 5mΩ / Cell
Over-charge:	Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, standard charge and then charge for 48hrs at 0.1C mA. The capacity of the cell or battery shall not be less than 5hrs when discharged at 0.2C mA.	It shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
.Short	Store the cell or battery for 1 hour after standard charge ， With less than 100 m Ω load to the battery short-circuit	It shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
Incorrect polarity charging	Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V， then 1C mandatory been caving 60 minutes	Not explosion
IEC Cycle Life	IEC285 (1993) 4.4.1	≥ 500 cell
Fast cycle life	Charge the cell 1.0C 85min, ,then leave for30min ， then discharge at 1CmA the subsequent capacity shall not be less than 80% of rated capacity	≥ 300cell

6.CAUTION

- Do not strike or drop GMB batteries.
- Store GMB batteries out of the reach of babies and small children. When charging or using a battery, do not let babies or small children remove the battery from the charger or the equipment being used.

- Be sure to charge GMB batteries within a temperature range of 0 to 40 deg C (degrees Celsius)
- Be sure to use the recommended charging method for GMB batteries read the battery charger's instruction manual carefully
- Do not use or store battery at high temperature, such as in strong direct sunlight, in cars during hot weather, or directly in front of a heater. This may cause leakage of battery fluid. It could also impair performance and shorten operating life of GMB batteries
- Be sure to turn off the equipment after use of GMB batteries, otherwise may result in leakage of battery fluid
- After removed from equipment, store GMB batteries in a dry place and within the recommended storage temperature range. This will help preserve the batteries' performance and durability and minimize the possibility of leakage of battery fluid or corrosion.(Toppoewr recommends the storage temperature range from -20 to +30deg.(for longer service life).
- To use batteries for the first time after purchase or having not used them for a long period of time, be sure to charge them.
- After long term storage, there is a possibility that the battery could not be fully charged. In order to fully charge it, please charge and discharge battery for a few times.
- As the electrochemical battery system constraints, long-term storage battery in the case, and suggested that the battery with 80% to 100% of the electricity.
- In order to maintain the performance of the battery in storage for six months, the proposal will use small current to the battery charge, discharge cycles a few weeks time and then use or storage.

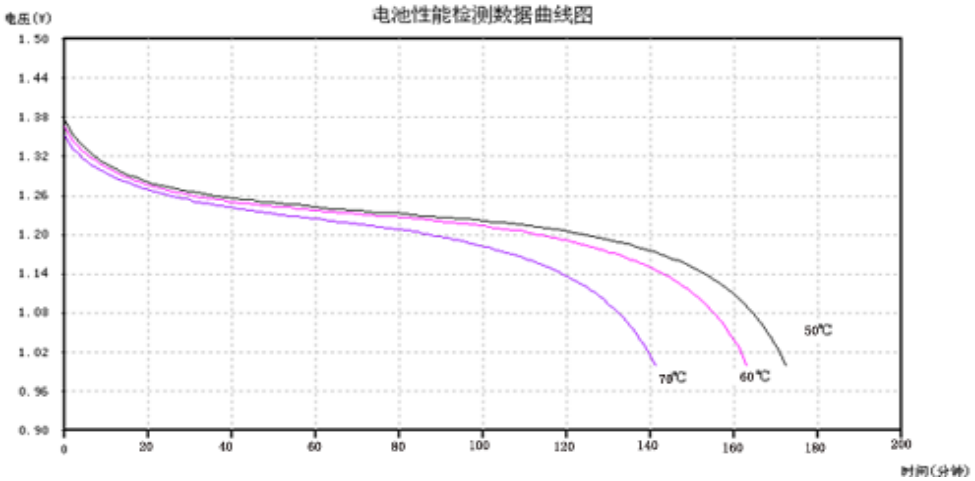


Fig 2