Rechargeable Batteries

Ni-MH
Rechargeable Batteries

Catalog & Selection Guide

Standard Series
High Drain Series
Long Cycle Life Series
Endurance and Longer Life Series

mAh
High Capacity
All Round Performance
High Discharge Rate
1000 times
10 years

10 years
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</table>
GP Batteries’ IEC62133-certified NiMH batteries and Lithium-ion offer quick market penetration into Certification Body scheme participating countries.*

GP Batteries manufactured 4 out of 8 brands worldwide of certified primary 9V brands against UL217 specifically for Smoke Alarm application.

GP Batteries is amongst the first batch of Lithium-ion battery brands that obtained voluntary CQC mark in China, as well as UR, BIS, and MC marks in the USA, India and Malaysia to respectively cater business needs more efficiently.

With UN38.3 certification, all GP Lithium-ion batteries are easily transported by air and sea to 5 continents*.

* Subject to national deviation, additional tests may be needed.

As a major brand in consumer batteries, GP Batteries adheres to strict safety and complies with the highest international safety standards.

GP Batteries is amongst the first batch of Lithium-ion battery brands that obtained voluntary CQC mark in China, as well as UR, BIS, and MC marks in the USA, India and Malaysia to respectively cater business needs more efficiently.

With UN38.3 certification, all GP Lithium-ion batteries are easily transported by air and sea to 5 continents*.

* Subject to national deviation, additional tests may be needed.
Awards

GP stands for excellence, and its track record is impressive. GP’s unwavering adherence to high standards has brought recognition from various entities.

Most Valuable Supplier:
This award was presented by Panasonic Corporation to recognize GP’s contributions as a supplier.

Asia Quality Best Practice Award:
Handed out by the International Six Sigma Council, the gold award celebrates GP being top in quality improvement.

MAKE (Most Admired Knowledge Enterprise) Award:
The award names organizations which out-perform their peers by above average growth in intellectual capital and wealth creation.

System Certification

In order to meet the increasing market demand, we make continuous improvement to ensure our Management System excellence for our stakeholders and clients. GP Batteries is certified against ISO9001, ISO14001, OHSAS18001, SA8000, as well as the highlighted below:

Global Security Verification (GSV)
Safety matters. Our GSV certified supply chain security excellence ensuring our trade with our clients are secure, protect against terrorist acts, and to combat illegal trafficking.

ISO26000 Social Responsibility
We speak as a global excellence brands, we value the relationship with our society and environment. Our social responsibility performance is certified against ISO 26000 which proved our promises to the welfare of society and environment.

ISO17025
Our China and Singapore laboratories are certified against ISO17025 – the general requirement for the competence of testing and calibration laboratories to offer the most reliable service to our clients.

Battery Experts

Laboratory Services

China and Singapore
GP Batteries’ quality assurance centers, located strategically in China, Singapore and Hong Kong, provide full range R&D facilities for quality and safety assurance.

Both China and Singapore laboratories are well-recognized by more than 90 international regions under International Laboratory Accreditation Cooperation-Mutual Recognition Agreement (ILAC-MRA).

China (Dongguan) - Chemical & Calibration Laboratory

- CNAS (China National Accreditation Service for Conformity Assessment) Accreditation
  - Testing scope
    - 2002/65/EC (RoHS Directive)
    - 2006/66/EC (Battery & Accumulator Directive)

Battery Performance Test in Singapore

- SAC-SINGLAS (Singapore Laboratory Accreditation Scheme) Accreditation
  - Testing scope
    - IEC 60086-1
    - IEC 60086-2
    - IEC 60086-5

Hong Kong Science Park

The Hong Kong laboratory, the first in Hong Kong, is the only 1 out of 8 certified to UL WTDP (Witnessed Test Data Program). It is also the only 1 out of 5 CTF (Customers’ Testing Facilities - Stage 1) approved facilities in the China and Hong Kong region.

UL Data Acceptance Program

- WTDP (Witnessed Testing Data Program)
  - UL1642
  - UL2054
  - UL62133
  - UL38.3

IEC Manufacturer’s Testing Laboratory

- CTF (Customers’ Testing Facilities (CTF) - Stage 1)
  - IEC62133

Reliability Test for Benchmarking

- Test conditions to be agreed with clients

Battery Experts

* Record as at end 2016.
The rechargeable Ni-MH batteries possess outstanding benefits in many regards of safety, portability and specifications.

**Home safe - Non-flammable**

The thoroughly tested NiMH batteries are one of GP’s fire-free safety offers to you. The notable non-flammable material inside and the cells with proven safety track record in the field for no risk to fire.

**Full range of cylindrical for easy adaption into electronic devices**

The handy Ni-MH comes in full-range standard cylindrical battery sizes for a wide range of applications, they facilitate easy adaptation to different electronic devices.

GP Batteries offers four NiMH rechargeable batteries solutions, which can be:

- **Standard Series**
  - This series has high capacity and balanced performances.
  - 10 years
  - 1000 times

- **Long Cycle Life Series**
  - The series can be recharged and discharged for up to 1000 times.
  - 10 years

- **High Drain Series**
  - This series offers high discharge rate.
  - $1000\text{ mAh}$

- **Endurance and Longer Life Series**
  - The expected cycle life of this series is up to 10 years with superb performance under high temperature.
  - $10\text{ years}$

**Ni-MH Series: Performance Comparasion**

- **Capacity**
- **Cycle Life**
- **Charge Retention**
- **Power Delivery**

**Ni-MH Batteries**

The rechargeable Ni-MH batteries possess outstanding benefits in many regards of safety, portability and specifications.
### Batteries Selection Guide

#### Cordless Phone

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimension (mm)</th>
<th>Nominal Voltage (V)</th>
<th>Rated Capacity (mAh)</th>
<th>Typical Capacity (mAh)</th>
<th>Approx. Weight (g)</th>
<th>LSD Type</th>
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<tr>
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<td>8.6 X 52.6 X 1.2</td>
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</tbody>
</table>

**#** With IEC62133 **With UL2054 approval.

#### GP Advantages

1. **Low self discharge** – excellent charge retention
2. **Fully automated production line** with excellent cell consistency that offers the best pack level performance
3. **Safety** – NiMH is an intrinsically safe chemistry and free from UN18.3 testing, not restricted in air transport
4. **Value for money**
5. **Recyclable and environmentally friendly**
### GP Advantages
1. **Sustainability & Environmentally Friendly**
   - Recyclable and energy efficient

### Rideable

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Diameter (mm)</th>
<th>Height (mm)</th>
<th>Nominal Voltage (V)</th>
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# With IEC62133
** With UL2054 approval.

### Ocean Series

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<th>Typical Capacity (mAh)</th>
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</table>

# With IEC62133
** With UL2054 approval.

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**Models in BLUE** are NiMH Ocean Series.
GP Advantages

1. Fully automated production line with excellent cell consistency that offers the best pack level performance
2. Safety – NiMH is an intrinsically safe chemistry and free from UN38.3 testing, not restricted in air transport
3. Value for money
4. Recyclable and environmentally friendly

Vacuum Cleaner

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Dimension (mm)</th>
<th>Nominal Voltage (V)</th>
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E-Shutter

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</table>

GP Advantages

1. Excellent performance at extreme temperature
2. Cater for extended service life requirement in this application (5-8 years)
3. Safety – NiMH is an intrinsically safe chemistry and free from UN38.3 testing, not restricted in air transport
4. Value for money
5. Recyclable and environmentally friendly
6. Fully automated production line with excellent cell consistency that offers the best pack level performance

# With ECE-01133
** With UL2054 approval.
GP Advantages
1. Cater for extended service life requirement in this application (5-8 years)
2. Excellent performance at extreme temperature including low temperature
3. Safety – NiMH is an intrinsically safe chemistry and free from UN38.3 testing, not restricted in air transport
4. Value for money
5. Recyclable and environmentally friendly
6. Fully automated production line with excellent cell consistency that offers the best pack level performance

GP Advantages
1. Comply with E-light compliance IEC60598-2-22 and ICEL1010
2. Specific model can meet up to 10 years’ service life
3. Safety – NiMH is an intrinsically safe chemistry and free from UN38.3 testing, not restricted in air transport
4. Value for money
5. Recyclable and environmentally friendly
6. Higher volumetric & gravimetric energy density compared with NiCd – NiMH is light in weight and small in size
Specifications

Industrial Series - Cylindrical Type

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Dimension (mm)</th>
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<th>Rated Capacity (mAh)</th>
<th>Typical Capacity (mAh)</th>
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<th>Max. Discharge Current (A)</th>
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| AAA       | GP60AAH    | 14.5 28.7      | 1.2                 | 600                  | 620                    | 14.0              | L80-1    |                            |
| AAA       | GP60AAH    | 14.4 48.2      | 1.2                 | 600                  | 820                    | 15.5              | L80-1    |                            |
| AAA       | GP70AAH    | 14.4 48.2      | 1.2                 | 700                  | 730                    | 17.0              | L80-1    |                            |
| AAA       | GP90AAMD   | 14.4 49.2      | 1.2                 | 900                  | 930                    | 20.0              | L80-1    |                            |
| AAA       | GP130AAM   | 14.4 49.2      | 1.2                 | 1300                 | 1350                   | 25.0              | L80-1    |                            |
| AAA       | GP130AAHC  | 14.5 50.5      | 1.2                 | 1300                 | 1350                   | 25.0              | L80-1    |                            |
| AAA       | GP155AAAH  | 14.4 48.2      | 1.2                 | 1500                 | 1550                   | 25.0              | L80-1    |                            |
| AAA       | GP160AAH   | 14.5 49.2      | 1.2                 | 1600                 | 1650                   | 25.0              | L80-1    |                            |
| AAA       | GP160AAHC  | 14.5 50.5      | 1.2                 | 1600                 | 1650                   | 25.0              | L80-1    |                            |
| AAA       | GP180AAH   | 14.5 49.2      | 1.2                 | 1800                 | 1850                   | 28.0              | L80-1    |                            |
| AAA       | GP180AAHC  | 14.5 50.5      | 1.2                 | 1800                 | 1850                   | 28.0              | L80-1    |                            |
| AAA       | GP200AAH   | 14.5 49.2      | 1.2                 | 2000                 | 2050                   | 28.0              | L80-1    |                            |
| AAA       | GP210AAH   | 14.5 50.5      | 1.2                 | 2100                 | 2150                   | 28.0              | L80-1    |                            |
| AAA       | GP220AAH   | 14.5 49.2      | 1.2                 | 2200                 | 2250                   | 28.0              | L80-1    |                            |
| AAA       | GP230AAHC  | 14.6 50.5      | 1.2                 | 2200                 | 2250                   | 28.0              | L80-1    |                            |

Ambient temperature range: Standard charge: 0 to 45°C, Fast Charge: 10 to 45°C, Discharge: -20 to 50°C, Storage: -20 to 35°C.

# With IEC62133 ** With UL2054 approval.

GP Advantages

1. Higher volumetric & gravimetric energy density compared with NiCd & Lead Acid – NiMH is light in weight and small in size.
2. Long calendar life, maintenance free and low cost of ownership.
3. Safety – NiMH is an intrinsically safe chemistry and free from UN38.3 testing, not restricted in air transport.
4. Recyclable and environmentally friendly.

Major Applications

- Cordless Phones
- Baby Monitors
- Transceivers
- Portable facsimile machines
- Portable Scanners
- Portable Printers
- Portable Video/Audio devices
- Photographic devices
- Personal Care devices
- Torches
- Remote Controllers etc.

Ocean Series

GP Advantages

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- Portable Video/Audio devices
- Photographic devices
- Personal Care devices
- Torches
- Remote Controllers etc.

Models in BLUE are NiMH Ocean Series.
L30-1: Fully charged, then store at 20°C for 1 year, 30% of minimum capacity can be retained.

L50-1: Fully charged, then store at 20°C for 1 year, 50% of minimum capacity can be retained.

L80-1: Fully charged, then store at 20°C for 1 year, 80% of minimum capacity can be retained.

# With IEC62133 ** With UL2054 approval.

Ambient temperature range: Standard charge: 0 to 45°C, Fast Charge: 10 to 45°C, Discharge: -20 to 50°C, Storage: -20 to 35°C.

### Specifications

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Dimension (mm)</th>
<th>Nominal Voltage (V)</th>
<th>Rated Capacity (mAh)</th>
<th>Typical Capacity (mAh)</th>
<th>Approx. Weight (g)</th>
<th>LSD Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>GP130AAT     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1300</td>
<td>1350</td>
<td>26.0</td>
<td>L80-1</td>
</tr>
<tr>
<td>AA</td>
<td>GP150AAT     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1500</td>
<td>1550</td>
<td>27.0</td>
<td>L50-1</td>
</tr>
<tr>
<td>AA</td>
<td>GP170AAT     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1700</td>
<td>1750</td>
<td>28.0</td>
<td>L50-1</td>
</tr>
<tr>
<td>AF</td>
<td>GP181AHV     **</td>
<td>17.0 43.0</td>
<td>1.2</td>
<td>1800</td>
<td>1850</td>
<td>32.0</td>
<td>L50-1</td>
</tr>
</tbody>
</table>

### Long Cycle Life Series

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Dimension (mm)</th>
<th>Nominal Voltage (V)</th>
<th>Rated Capacity (mAh)</th>
<th>Typical Capacity (mAh)</th>
<th>Approx. Weight (g)</th>
<th>LSD Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>GP6AAAACB     **</td>
<td>10.5 44.9</td>
<td>1.2</td>
<td>800</td>
<td>820</td>
<td>14.0</td>
<td>L80-2</td>
</tr>
<tr>
<td>AA</td>
<td>GP210AAACB    **</td>
<td>14.5 50.5</td>
<td>1.2</td>
<td>2000</td>
<td>2050</td>
<td>30.0</td>
<td>L80-2</td>
</tr>
</tbody>
</table>

Ambient temperature range: Standard charge: 0 to 45°C, Fast Charge: 10 to 45°C, Discharge: -20 to 50°C, Storage: -20 to 35°C. # With IEC62133 """"With UL2054 approval.

### High Drain Series

<table>
<thead>
<tr>
<th>Cell Size</th>
<th>Model</th>
<th>Dimension (mm)</th>
<th>Nominal Voltage (V)</th>
<th>Rated Capacity (mAh)</th>
<th>Typical Capacity (mAh)</th>
<th>Approx. Weight (g)</th>
<th>LSD Type</th>
<th>Max. Discharge Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>GP130AAHV     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1300</td>
<td>1350</td>
<td>26.0</td>
<td>L80-1</td>
<td>13</td>
</tr>
<tr>
<td>AA</td>
<td>GP150AAHV     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1500</td>
<td>1550</td>
<td>27.0</td>
<td>L50-1</td>
<td>15</td>
</tr>
<tr>
<td>AA</td>
<td>GP170AAHV     **</td>
<td>14.5 49.2</td>
<td>1.2</td>
<td>1700</td>
<td>1750</td>
<td>28.0</td>
<td>L50-1</td>
<td>15</td>
</tr>
<tr>
<td>AF</td>
<td>GP181AHV      **</td>
<td>17.0 43.0</td>
<td>1.2</td>
<td>1800</td>
<td>1850</td>
<td>32.0</td>
<td>L50-1</td>
<td>15</td>
</tr>
</tbody>
</table>

Definition of LSD type:
L80-1: Fully charged, then store at 20°C for 1 year, 80% of minimum capacity can be retained.
L50-1: Fully charged, then store at 20°C for 1 year, 50% of minimum capacity can be retained.
L30-1: Fully charged, then store at 20°C for 1 year, 30% of minimum capacity can be retained.

Major Applications
Vacuum Cleaners, Home Appliances, Gardening Tools, etc.
Pack Configuration and Code

Designation System for Battery Packs

Example:

GP130AAM4B1P

- Model Number
- Configuration code
- Tag direction code
- Tag type code
- Number of cells in a pack

For battery packs with connectors, the last two digits will be used to specify connector type.

eg: GP130AAM4BMU

Standard Configurations for Battery Packs

Tag Type Specifications

- CODE: 1 (Strip solder tag)
- CODE: 2 (PCB solder tag)
- CODE: 3 (Double PCB pin at positive terminal and single PCB pin at negative terminal)
- CODE: 4 (Solder wire tag)
- CODE: 5 (Short strip tag)
- CODE: 6 (Lead wire)

Tag Direction Code

- CODE: P (Pointing at 180°)
- CODE: H (Pointing at the same direction)

Tailor Tag

- CODE: V
- CODE: W
- CODE: Y

Cells are arranged in a horizontal irregular triangle
Cells arranged in horizontal zig-zag rows (in one or more layers)
Cells arranged in a horizontal rectangle

Connector Type Specifications

- MU Universal Plug
- M/L JST SHR-2
- M/L Victor 5284-02
- MS Mitsubishi ME3MB3-02
Performance Characteristics

Charge Characteristics:
A NiMH battery is restored for use by external recharging process. The charge voltage changes due to current, ambient temperature and time.

Cycle Life Characteristics:
Cycle life refers to the number of charge-discharge cycles a battery can perform before its discharge capacity (0.2C) drops to 60% of the nominal capacity per IEC 61951-2 or other guaranteed value per GP specifications. A battery’s cycle life changes due to ambient temperature and the depth of charge and discharge.

Discharge Characteristics:
A NiMH battery has a nominal discharge voltage of 1.2V. The discharge voltage is subject to change due to current, ambient temperature and time.

Charge Retention:
A fully charged L80-1 battery can retain 80% of its minimum capacity if stored at 20°C for one year, while an L80-2 battery can retain the same level after two years.

Pack Configuration and Code

What Do We Provide?

One Stop Solution

Testing Service
UN / UL / IEC

Charger
Total Solution

Battery Pack
Hard Pack Level

Battery Pack
Soft Pack Level

Cell
Bare Cells

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