



Art.-Nr: 123411  
Bezeichnung: X4500SCR

| <b>Customer recognition</b>  | <b>Signature confirmation</b> |       |
|--|-------------------------------|-------|
| Please carefully verify all the function of the Product,<br>After signing recognize that function of product is<br>Correct by customers, and all the function of products<br>are in line with specifications of the customers. | Approval:                     |       |
|  | Sign:                         | Date: |



**Remarks:**

1.  $C_5$  means the value of the nominal capacity of a cell.

**A. Basic index**

|                                    |                 |                           |
|------------------------------------|-----------------|---------------------------|
| Type                               |                 | Sealed Rechargeable Ni-MH |
| Model                              |                 | GLH-SC4500-10C            |
| Size                               |                 | SC                        |
| Nominal Voltage (V)                |                 | 1.2V                      |
| Minimum Capacity (mAh)             |                 | 4250 mAh                  |
| Typical Capacity (mAh)             |                 | 4350 mAh                  |
| Typical Weight                     |                 | 67g                       |
| Dimension                          | Height          | 43.8(±0.2mm)              |
|                                    | Diameter        | 22.9(±0.2mm)              |
| Standard Charge                    | Current (mA)    | 450(0.1 $C_5$ )           |
|                                    | Time (min)      | 960 min                   |
| Quick Charge                       | Current (mA)    | 2250 (0.5 $C_5$ )         |
|                                    | Time (h)        | -∇V 5mv                   |
| Rapid Charge                       | Current (mA)    | 4500 (1 $C_5$ )           |
|                                    | Time (min)      | -∇V 5mv                   |
| Operation Temperature(°C)          | Standard Charge | 0~45°C                    |
|                                    | Quick Charge    | 0~40°C                    |
|                                    | Rapid Charge    | 0~40°C                    |
|                                    | Discharge       | -20~55°C                  |
| Storage Temperature(°C)            | ≤12 months      | -20~25°C                  |
|                                    | ≤3 months       | -20~35°C                  |
|                                    | ≤1 month        | -20~40°C                  |
| Trickle Charge (mA)                |                 | 39~65                     |
| Maximum Discharge (mA)(continuous) |                 | 30A—45A                   |
| Internal Impedance (mΩ)            |                 | ≤ 5 (1000Hz)              |
| Charge Retention(20°C)             |                 | ≥70%                      |
| IEC Cycle Life (Times)             |                 | ≥500                      |
| 30A Discharge Cycle Life (Times)   |                 | ≥60                       |



### B. Test Report

Tests are carried out within one month of delivery under the following conditions:

**Room Temperature**  $20\pm 5^{\circ}\text{C}$

**Relative Humidity**  $65\%\pm 20\%$

And all the test standards are conformed to IEC61951-2 standards

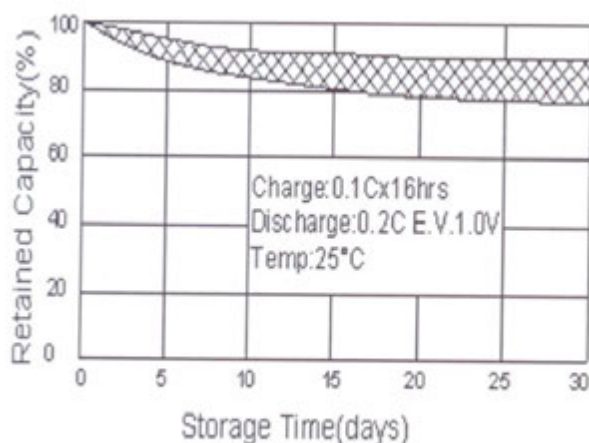
| Test items                       | Test condition   | Test results   |
|----------------------------------|--|--|
| Internal Impedance               | After the battery is fully charged, within 4 hour, the impedance is tested by 1000Hz AC source.  | $\leq 5 \text{ m}\Omega$   |
| Capacity (Quick Charge)          | Discharging at 880 mA to 1.00V/ pack.<br>Charging at 450mA for 15 hour,<br>Discharging at 880mA to 1.0V/ pack.<br>Measuring the discharge time   | Up to 3 cycles are allowed<br><br>$\geq 300\text{min}$   |
| 30A Capacity                     | Discharging at 2250mA to 1.0V, Charging at 2250mA for $\nabla V 5\text{mv}$ ,<br>30A discharge to 0.9V<br>Measuring the discharge Capacity   | Up to 3 cycles are allowed<br><br>Minimum Capacity<br>$\geq 4250\text{mAh}$<br>MPV $\geq 1.16\text{V}$ |
| MPV                              | Mean Voltage   |  |
| 30A Discharge Cycle Life (Times) | Discharging at 2250mA to 1.00V/ pack.<br>Charging at 2250mA for $\nabla V 5\text{mv}$<br>30A discharge to 0.9V<br>Stand Ting for 90min, life-cycle test:<br>Charging at 2250mA for $\nabla V 5\text{mv}$<br>30A discharge to 0.9V<br>Stand Ting for 90min, Cycle No 60 | Cycle No 60:<br>Residual capacity<br><br>$\geq 4050\text{mAh}$<br>(90%)                                |
| Charge Retention                 | The fully charged battery is held under temperature of $20\pm 2^{\circ}\text{C}$ for 28 days, the capacity is measured at 880mA discharging rate   | $\geq 210\text{min}$   |
| Voltage Retention                | Discharging at 2250mA to 1.00V/ pack.Charging at 1000mA for 2.3 hour, $20\pm 5^{\circ}\text{C}$ stored 6 months  | Volt $\geq 1.10\text{V}$   |
|                                  | Discharging at 2250mA to 1.00V/ pack.Charging at 1000mA for 2.3 hour, $30\pm 5^{\circ}\text{C}$ stored 4 months  | Volt $\geq 1.10\text{V}$   |



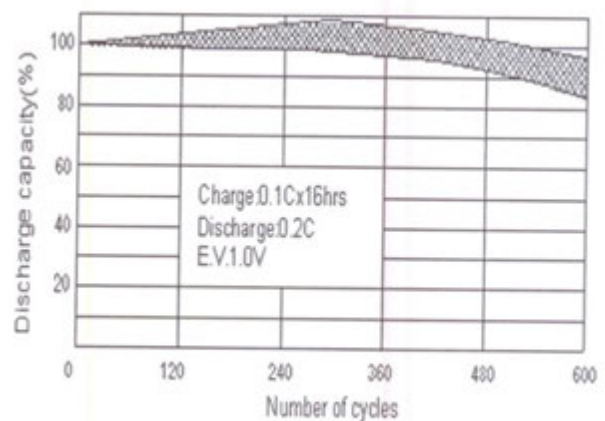
|                           |  |  |
|---------------------------|--|--|
| Overcharge test           | The cell is charged continuously for 60 hour at 0.1C   | No functional change, No leakage                               |
| IEC Cycle Life            | IEC61951-2(2003)7.4.1.1  | ≥500   |
| Low Temperature Discharge | Standard Charge,<br>Storage: 24hrs at 0±2°C<br>0.2C discharge at 0±2°C   | ≥180min  |
| Short circuit test        | The is fully charged cell is shorted for 1 hour with a load or lighter with its resistance less than 100mΩ. This test must be carried out in a protective chamber  | Operation of safety valve<br>No explosion<br>Leakage may occur |
| Bump test                 | The bump test is carried out under the following conditions:<br>Peak acceleration: 98m/s <sup>2</sup><br>Corresponding duration of pulse: 16ms<br>Corresponding velocity change: 1.00m/s<br>Number of bumps: 1000times: 1000 次 | No functional change, No leakage                               |
| Free falling(drop)        | Charge at 0.1C for 16hrs, and then leave for 24hrs, check battery before / after drop<br>Height: 100 cm<br>Thickness of wooden board: 20mm<br>Direction is not specified<br>Test for 6 times                                   | ΔV<0.02V/cell<br>ΔRi<5%/cell                                   |

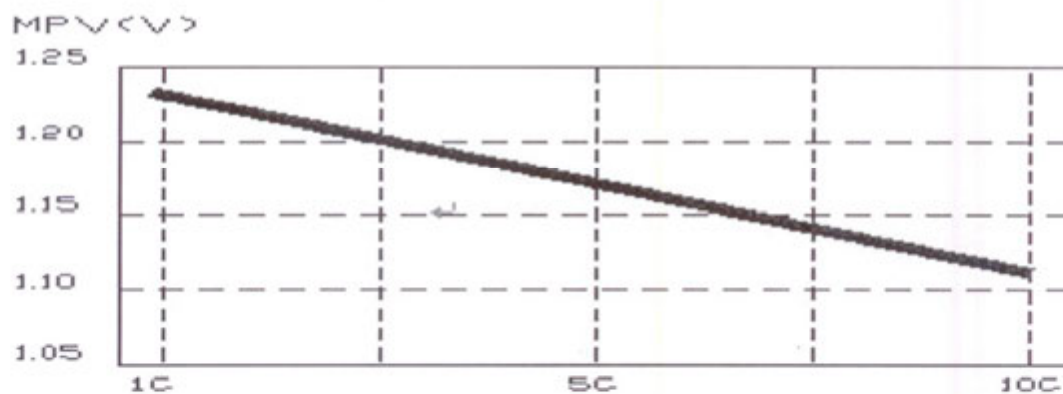
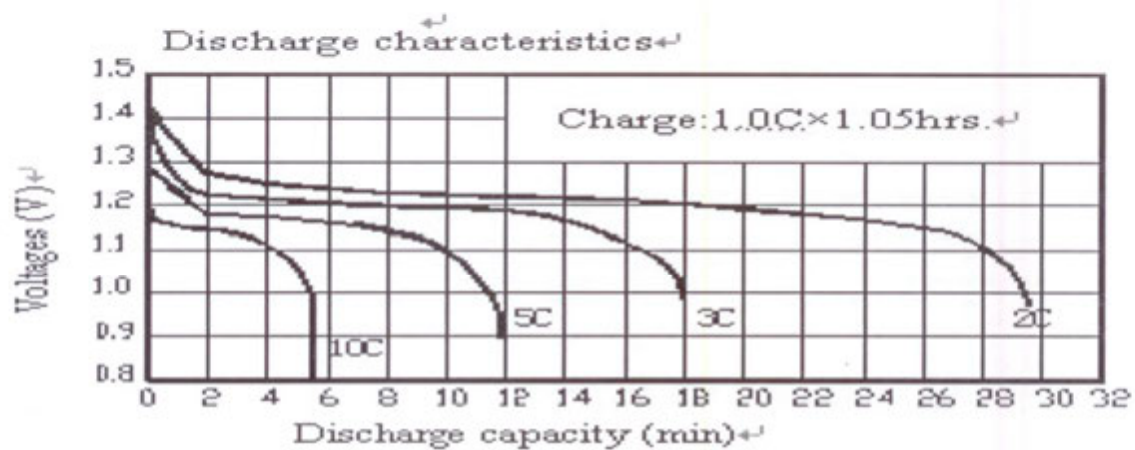
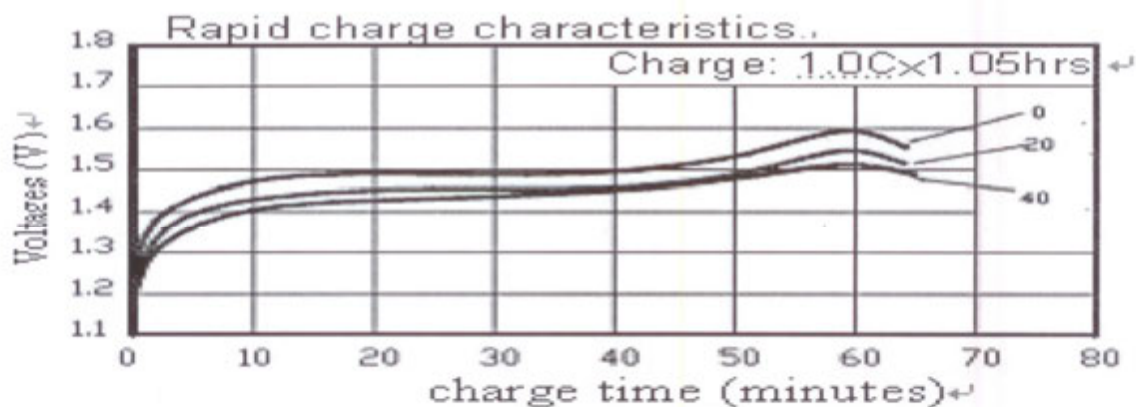
## C. General Characteristic

### Storage Characteristics



### Cycle Life







#### D. Precautions:

1. Batteries should be charged prior to use.
2. When using a new battery for the first time or after long term storage, please fully charge the battery Before use.
3. For charging methods please reference to our technical handbook.
4. Use the correct charger for Ni-Cd or Ni-MH batteries.
5. Do not reverse charge batteries.
6. Do not short circuit batteries, permanent damage to batteries may result.
7. Do not incinerate or mutilate batteries, may burst or release toxic material.
8. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive Overcharge / overdischarge.
9. Store batteries in a cool dry place.
10. Do not mix Gelong batteries with other battery brands or batteries of a different chemistry such as Alkaline and zinc carbon.
11. Do not mix new batteries in use with semi-used batteries, overdischarge may occur.
12. Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
13. When connecting a battery pack to a charger, ensure correct polarity.
14. If find any noise, excessive temperature or leakage from a battery, please stop its use.
15. When the battery is hot, please do not touch it and handle it, until it has cooled down.
16. Do not remove the outer sleeve from a battery pack nor cut into its housing.
17. When find battery power down during use, please switch off the device to avoid overdischarge.
18. When not using a battery, disconnect it from the device.
19. Unplug a battery by holding the connector itself and not by pulling at its cord.
20. After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
21. Never put a battery into water or seawater.
22. During long term storage, battery should be charged and discharged once every 4 months.
23. 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.
24. Keep away from children. If swallowed, contact a physician at once.
25. Please contact Gelong before conducting those destructive tests.





### E.Append: IEC Endurance in cycles

Before the endurance in cycles test, the cell shall be discharged at 0.2  $I_A$  to a final voltage of 1.0V/cell. The following endurance test shall then be carried out, irrespective of cell designation, in an ambient temperature of  $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ . Charge and discharge shall be carried out at constant current throughout, using the conditions specified in table 5. Precautions shall be taken to prevent the cell-case temperature from rising above  $35^{\circ}\text{C}$  during the test, by providing a forced air draught if necessary.

NOTE-Actual cell temperature, not the ambient temperature, determines cell performance.

**Table 5-Endurance in cycles**

| Cycle number   | Charge                    | Stand in Charged condition | Discharge                               |
|--|---------------------------|----------------------------|---|
| 1  | 0.1 $C_A$ for 16 h        | None                       | 0.25 $C_A$ for 2 h 20 min <sup>2)</sup> |
| 2 to 48  | 0.25 $C_A$ for 3 h 10 min | None                       | 0.25 $C_A$ for 2 h 20 min <sup>2)</sup> |
| 49   | 0.25 $C_A$ for 3 h 10 min | None                       | 0.25 $C_A$ to 1.0V/cell                 |
| 50   | 0.1 $C_A$ for 16 h        | 1h to 4h                   | 0.2 $C_A$ to 1.0V/cell                  |
| <ul style="list-style-type: none"><li>● It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50, so as to start cycle 51 at an exact two-week interval. A similar procedure may be adopted at cycles 100, 150, 200, 250, 300, 350, 400 and 450.</li><li>● If cell discharge voltage drops below 1.0V/cell, discharge may be discontinued.</li></ul> |                           |                            |   |

Cycles 1 to 50 shall be repeated until the discharge duration on any 50<sup>th</sup> cycle becomes less than 3h at this stage, a further cycle as specified for cycle 50 shall be carried out. The endurance test is considered complete when two such successive cycles give a discharge duration less than 3h. The number of cycles obtained when the test is completed shall be not less than 500.