1. SCOPE

This specification governs the performance of the following GP Nickel-Metal Hydride Cylindrical Cell and its stack-up batteries.

GP Model: GP270AAHC
Cell Size: AA

The data involving nominal voltage and the approximate weight of stack-up batteries shall be equal to the value of the unit cell multiplied by the number of unit cells in the battery. For example, a stack-up battery consists of three unit cells:

Nominal Voltage of unit cell = 1.2V
Thus, nominal voltage of stack-up battery = 1.2V x 3 = 3.6V
For batteries which has 2 cells or above per pack, capacity may not have the below stated minimum capacity due to increased in impedance from inter-cell connection and protection components.

2. RATINGS

Notes : Standard Charge / Discharge Conditions:
Charge : 255mA (0.1C) x 16hrs
Discharge : 510mA (0.2C) to 1.0V/cell

Description	Unit	Specification	Conditions
Nominal Voltage	V	1.2	Unit cell
Typical Capacity	mAh	2,550	Standard Charge/ Discharge
Nominal Capacity	mAh	2,550	Standard Charge/ Discharge
Minimum Capacity	mAh	2,550 (Unit cell)	Standard Charge/ Discharge
Standard Charge	mA	255 (0.1C)	T_a= 0~ 45°C (see Note 1)
	hour	16	
Fast Charge	mA	2,550 (1C)	dT/dt = 0.8-1°C/minute -∆V = 0 ~ 5mV/cell Timer CutOff =100% input capacity (for ref.only) Temp. CutOff =45 - 50°C T_a= 10 ~ 45°C
	hour	1.0 approx. (see Note 2)	
Trickle Charge	mA	128(0.05C) ~ 255(0.1C)	T_a= 0 ~ 45°C
Discharge Cut-off Voltage	V	1.0	Unit cell
Maximum Discharging Current	mA	7,650(3C)	T_a= -20 ~ 50°C
Storage Temperature	℃	-20 ~ 35°C	
Typical Weight	gram	31.0	Unit cell

3. PERFORMANCE

Unless otherwise stated, tests should be done within one month after receipt under the following conditions :

Ambient Temperature, T_a : 20 ± 2°C and
Relative Humidity : 65 ± 20%.

Notes : Standard Charge / Discharge Conditions:
Charge : 255mA (0.1C) x 16hrs
Discharge : 510mA (0.2C) to 1.0V/cell

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥ 2,550 (Unit cell)	Standard Charge/Discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V	≥ 1.25	Within 1hr after standard charge	Unit cell
Internal Impedance (Ri)	mΩ	≤ 28	Upon fully charge (1kHz)	Unit cell
High Rate Discharge (0.5C)	min	≥ 108 (Unit cell)	Standard Charge, 1hr rest before discharge	
High Rate Discharge (1C)	min	≥ 51 (Unit cell)	Standard Charge, 1hr rest before discharge	
Overcharge	N/A	No leakage nor explosion	250mA (0.1C) charge 1 year	
Charge Retention	mAh	≥ 1,785	Standard Charge, Storage: 6monthsdays, Standard Discharge	
		≥ 1,275	Standard Charge, Storage: 12 months, Standard Discharge	
IEC Cycles Test	Cycle	> 300	IEC 61951-2	(see Note 3)
Accelerated Cycle Life	Cycle	≥ 150	Charge: 2,500mA (1C), Discharge: 2,500mA (1C) to 1.0V/cell, Rest: 1 hour End - of - life: 80% nominal capacity. (Standard charge / discharge)	Cycling Charging CutOff condition: -ΔV = 5mV/cell

Test	Unit	Specification	Conditions	Remarks
Leakage	N/A	No leakage nor deformation	Fully charged at 2,550mA (1C), stand for 14 days	
External Short Circuit	N/A	No fire and no explosion.	After standard charge, short circuit the cell(s) at 20+/-5℃ until the cell(s) temperature returns to ambient temperature. (The resistance of the inter-connecting circuitry shall not exceed 0.1 ohm.)	
Vibration Resistance	N/A	Change of voltage should be under 0.02V/cell, Change of impedance should be under 5 milli-ohm/cell.	Charge the battery 0.1C 16hrs, then leave for 24hrs, check battery before / after vibration, Amplitude: 1.5mm Vibration: 3000CPM Any direction for 60mins.	Unit cell
Impact Resistance	N/A	Change of voltage should be under 0.02V/cell, Change of impedance should be under 5 milli-ohm/cell.	Charge the battery 0.1C 16hrs, then leave for 24hrs, check battery before / after dropped, Height : 50cm Wooden board (thickness 30mm) Direction not specified, 3 times.	Unit cell

4. CONFIGURATION, DIMENSIONS AND MARKINGS

Please refer to the attached data sheet.

5. EXTERNAL APPEARANCE

The cell / battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

6. WARRANTY

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

7. CAUTION

1. Batteries should be charged prior to use.
2. For charging methods please referred to our technical handbook.
3. Use the correct charger for Ni-Cd or Ni-MH batteries.
4. Do not reverse charge batteries..
5. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive

over charge/over discharge.

6. 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..
7. Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or firemay result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
8. Keep away from children. If swallowed, contact a physician at once.
9. Do not short circuit batteries, permanent damage to batteries may result.
10. Do not incinerate or mutilate batteries, may burst or release toxic material.
11. Do not solder directly to cells or batteries.
12. Store batteries in a cool dry place.
13. If find any noise, excessive temperature or leakage from a battery, please stop its use.
14. When not using a battery, disconnect it from the device.
15. When using a new battery for the first time or after long term storage, please fully charge the battery before use.
16. Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
17. When connecting a battery pack to a charger, ensure correct polarity.
18. When the battery is hot, please do not touch it and handle it, until it has cooled down.
19. Do not remove the outer sleeve from a battery pack nor cut into its housing.
20. When find battery power down during use, please switch off the device to avoid over discharge.
21. Unplug a battery by holding the connector itself and not by pulling at its cord.
22. After use, if the battery is hot. Before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
23. Never put a battery into water or seawater.
24. In order to maintain satisfactory cell/battery performance when being stored under extending period of time, cycling (i.e. charging and discharging) of the cell / battery within 6 months period is highly recommended. At least one times cycling should be conducted within one year.

Notes : 1. T_a: Ambient Temperature
2. Approximate charge time from discharged state, for reference only.
3. IEC 61951-2 Cycle Life Test :

Cycle No.	Charge	Rest	Discharge
1	0.1C x 16hrs	none	0.25C x 2hrs20mins
2 - 48	0.25C x 3hrs10mins	none	0.25C x 2hrs20mins
49	0.25C x 3hrs10mins	none	0.25C to 1.0V/cell
50	0.1C x 16hrs	1- 4hr(s)	0.2C to 1.0V/cell
Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3hrs			