1. SCOPE

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

Cell Size: 2/3 AAA

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 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

2. RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V	1.2	Unit cell
Typical Capacity	mAh	388	Standard Charge / Discharge
Nominal Capacity	mAh	370	Standard Charge / Discharge
Standard Charge	mA	37 (0.1C)	T_a = 0 ~ 45°C (see Note 1)
	hr	14	
Fast Charge	mA	370 (1C)	-ΔV = 0 ~ 5mV/ cell or Timer cutoff = 105% input capacity Temp. cutoff = 45 ~ 50°C T_a = 10 ~ 45°C dT/dt = 0.8 ~ 1°C/min (1C)
	hr	1.05 approx. (see Note 2)	
Trickle Charge	mA	18.5 (0.05C) ~ 37 (0.1C)	T_a = 0 ~ 45°C
Discharge Cut-off Voltage	V	1.0	Unit cell
Maximum Discharging Current	mA	1110 (3C)	T_a = -20 ~ 50°C
Storage Temperature	°C	-20 ~ 35	Discharged state
Typical Weight	g	7.5	Unit cell

3. PERFORMANCE

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

Ambient Temperature, T_a : 20 ± 5°C
Relative Humidity : 65 ± 20%RH

Notes : Standard Charge / Discharge Condition
Charge : 37mA (0.1C) x 14hrs
Discharge : 74mA (0.2C) to 1.0V/cell

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥ 370	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	≤ 100	Upon fully charge (1kHz)	Unit cell
High Rate Discharge (1C)	min	≥ 48	Standard Charge, 1hr rest before discharge	
Overcharge	N/A	No leakage nor explosion	37mA (0.1C) charge for 1yr	
Charge Retention	mAh	≥ 296 (80%)	Standard Charge, Storage: 28 days, Standard Discharge	
IEC Cycles Test	Cycle	> 500	IEC 61436 (1998) 4.4	(see Note 3)
Accelerated Cycle Life	Cycle	> 300	Charge: 370mA (1C) Discharge: 370mA (1C) to 1V/cell End of life: 80% of nominal capacity	Cycling charging cutoff condition: -ΔV = 0 ~ 5mV/cell or timer cutoff = 105% of input capacity
Leakage	N/A	No leakage nor deformation	37mA (0.1C) charge for 1yr	
Short Circuit	N/A	Leakage & deformation may occur, but no explosion is allowed	After standard charge, short circuit for 1hr (leading wire = 0.75mm² x 20mm)	

Test	Unit	Specification	Conditions	Remarks
Vibration Resistance	N/A	ΔV < 0.02V ΔRi (Internal impedance) < 5mΩ	Charge at 0.1C for 14hrs, and then leave for 24hrs, check battery before / after vibration Amplitude: 1.5mm Vibration: 3000CPM (any direction for 60mins)	Unit cell
Impact Resistance	N/A	ΔV < 0.02V ΔRi (Internal impedance) < 5mΩ	Charge at 0.1C for 14hrs, and then leave for 24hrs, check battery before / after drop Height: 50cm Thickness of the wooden board: 30mm Direction is not specified Test for 3 times	Unit cell

4. CONFIGURATIONS, DIMENSIONS AND MARKINGS

Please refer to the related drawing.

5. EXTERNAL APPEARANCE

The cell / battery shall be free from cracks, scars, breakage, rust, discoloration, leakage and deformation.

6. WARRANTY

One year limited warranty against workmanship and material defects.

7. CAUTION

1. Reverse charging is not acceptable.
2. Charge before use as the cells / batteries are delivered in an uncharged state.
3. Do not charge / discharge with more than the specified current.
4. Do not short circuit the cell / battery. Permanent damage to the cell / battery may result.
5. Do not incinerate or mutilate the cell / battery.
6. Do not solder directly to the cell / battery.
7. The life expectancy may be reduced if the cell / battery is subjected to adverse conditions like: extreme temperature, deep cycling, excessive overcharge / overdischarge.

8. Store the cell / battery in a cool dry place. Always discharge the cell / battery before bulk storage or shipment.
9. For storage of cells / batteries over one year, in order to prevent the degrading the function of cells, cells / batteries should be at least charged and discharged once within one year.
10. Keep away from children. If swallowed, contact a physician at once

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Notes : 1. T_a: Ambient Temperature
2. Approximate charge time from discharged state, for reference only.
3. IEC 61436(1998) 4.4 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
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3hrs			