EVERGREEN (C.P.) USA INC.
TEL: (650) 952-8091 FAX: (650) 952-3629 E-MAIL: sales@evergreencpusa.com

SPECIFICATIONS
Sealed Rechargeable Nickel Metal Hydride
Ni-MH 600mAh 1/2AA

1. SCOPE

The specifications governs the performance of the following Nickel Metal-Hydride Cylindrical cell and its battery pack.. (Refer to the attached figure 1)

Rated capacity: 600mAh

Designation: NH12AA600 15/24 1/2AA (*D*: $14.5^{0}_{-0.7}$mm *H*: $24.0^{0}_{\pm 0.5}$mm)

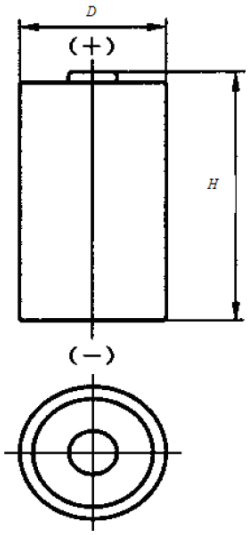

Figure 1- Jacketed cylindrical cells

2. DATA OF BATTERY PACK

The data of battery pack, including voltage and weight, is almost equivalent to the multiple numbers of the relevant single cells.

Example: Battery pack consisting three single cells

Nominal voltage of single cell = 1.2V

Nominal voltage of battery pack = 1.2V×3 = 3.6V

3. RATINGS

Table 1 - Ratings of the cells

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	Single cell
Nominal Capacity	mAh	600	Standard Charge/Discharge

4. PERFORMANCE

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

Ambient Temperature: 20±5℃

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Relative Humidity: 65±20%

Standard Charge/Discharge Conditions:

Preparative: Prior to charging, the cell shall be discharged by 120mA (0.2I_tA) to 1.0V

Charge: 60mA(0.1I_tA)×16hours

Stand in charged condition: 1~4h

Discharge: 120mA (0.2I_tA) to 1.0V/Cell

Table 2 – Performance and test methods[b]

Test Item		Unit	Specification	Test Conditions	Remarks
Discharge performance	20 °C[a]	h	≥5	Standard Charge/Discharge	/
		min	≥54	After Standard Charge, stored for 1~4h, then discharged by 600mA (1.0I_tA) to 0.9V.	/
	0°C	h	≥4	After Standard Charge, stored for 16~24h in 0±2°C, then discharged by 120mA (0.2I_tA) to 1.0V in 0±2°C.	/
Charge (capacity) retention		h	≥3h	After Standard Charge, stored on open circuit for a period of 28days, then discharged by 120mA (0.2I_tA) to 1.0V.	/
Endurance in cycles		cycle	≥500	Appendix table 3	/
Permanent charge endurance		h	≥3	Appendix table 4	/
Over charge		h	≥5	Charge:60mA(0.1I_tA) for 48h; Storage: 1~4h Discharge:120mA(0.2I_tA) to 1.0V	/
Safety device operation		Not disrupt or burst		Undergo a forced discharge at constant current 120mA (0.2I_tA) to 0V. Then discharged by 600mA (1.0I_tA) for 60min.	/
Storage[b]		hour	≥5	Stored on open circuit for 12 months. Then standard charge/discharge.)	/
Internal resistance		mΩ	≤42	Within 1~4h after standard Charge (1000Hz)	
Weight		g	12.0 (approx)	/	Reference
Vibration		No leakage, no fire, no explosion		IEC 62133 2012 7.2.2	/
Free fall		No fire, no explosion		IEC 62133 2012 7.3.3	/

a) Five cycles is permitted b) Unless otherwise stated, the cell shall be discharged by 120mA (0.2I_tA) to 1.0V before test.

***Notice** : Test conditions is drawn according to IEC 61951-2 2011; Please refer to the related description of the standard.*

5. CONFIGURATION, DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

6. EXTERNAL APPEARANCE

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

7. CAUTION

(1) Reverse charging is not acceptable.

(2) Charge before use. The cells/batteries are delivered in an uncharged state.

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(3) Do not charge/discharge with more than our specified current.

(4) Prevent short circuit, do not incinerate or disassemble the cell/battery.

(5) Do not solder directly to the cell/battery for a long time.

(6) The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.

(7) Store the cell/battery in a cool and dry place. Always discharge batteries before assemble or solder.

(8) Always discharge batteries before bulk storage or shipment.

(9) Do not mix batteries of different types and capacities.

Appendix

A) Endurance in cycles

Prior to the endurance on cycle test, the cell shall be discharged at 120mA (0.2I_tA) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 3.

Table 3 Endurance in cycles

Cycle number	Charge	Stand in charged condition	Discharge
1	0.1I_tA for 16h	none	0.25I_tA for 2h20min
2~48	0.25I_tA for 3h10min	none	0.25I_tA for 2h20min
49	0.25I_tA for 3h10min	none	0.25I_tA to 1.0V
50	0.1I_tA for 16h	1h~4h	0.20I_tA to 1.0V[a]
a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or the cell voltage drops below 1.0V during 1~48th cycle.			

B) Permanent charge endurance

Prior to the endurance on cycle test ,the cell shall be discharged at 120mA(0.2I_tA) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 4.

Table 4 Permanent charge endurance

Cycle number	Charge	Discharge[a]
1	0.05$1I_t$A for 91days	0.2I_tA to 1.0V
2	0.05$1I_t$A for 91days	0.2I_tA to 1.0V
3	0.05$1I_t$A for 91days	0.2I_tA to 1.0V
4	0.05$1I_t$A for 91days	0.2I_tA to 1.0V
a) The discharge is carried out immediately upon completion of discharge.		

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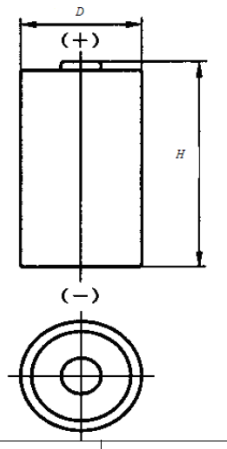
Base Data: NH12AA600 (15/24) Size 1/2AA600mAh



D	$14.5^{0}_{-0.7}$mm
H	$24.0^{0}_{\pm 0.5}$mm
/	/
/	/

Nominal voltage			1.2V
Capacity comparison(mAh)		0.2I_tA	1.0I_tA
		600	540
Weight(g)			12.0
Internal Impedance at 1000Hz (After Charge;mΩ)			≤42
Charge current		**Standard**	60mA
		Rapid	600mA
Charge time		**Standard**	16h
		Rapid	72min , plus 2h by 0.1I_tA
Temperature **Ambient**	**charge**	**Standard**	0~+35℃
		Rapid	+10~+35℃
	Discharge		-20~+45℃
	Storage		-20~+35℃

Electrical Performance: