

SPECIFICATIONS

REF NO:

(Customer Name): _____

(Part Name): _____ Cylindrical Ni-MH rechargeable battery

(Specification): _____ 3×28AA600

(Brand): _____ CEL

(Customer P/N): _____

(Date): _____ 2018-09-21

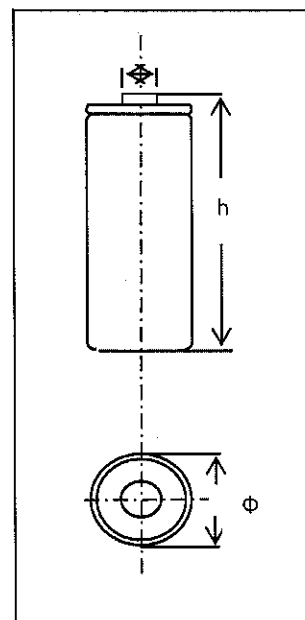
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- ※ In case of any special requirement on the quality, please feel free to contact our sales
- ※
- ※ Thanks for awarding this opportunity of sample approval, please return this form to us for filing after authentication

Specification

Type	: Rechargeable Nickel Metal Hydride Cylindrical Cell
Nominal Dimension	: $\Phi = 14.5^{+0}_{-0.7}$ mm, $h = 28.5^{+0}_{-1.5}$ mm(with sleeve)
Nominal Capacity	: 600mAh (20°C, 0.2C discharge to 1.0V/cell)
Nominal Voltage	: 1.2V
Internal Resistance	: $\leq 35\text{m}\Omega$ (at 1 kHz, fully charged, 20°C, average)

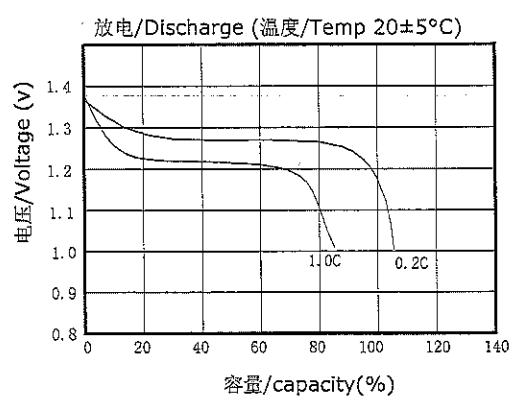
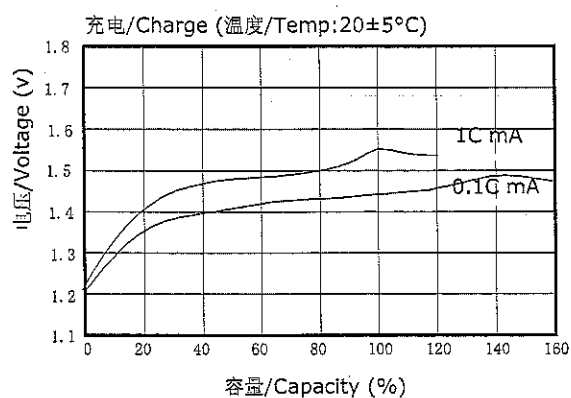
Applications	: Recommended discharge current 0.02C to 2.0C
Standard Charge	: 0.1C for 16hrs at 20°C
Service Life	: >500 cycles (20°C, IEC Standard)

Average Weight	: 15.0g
Typical Capacity	: (20°C) 1.0C $\geq 56\text{min}$ (1.0C discharge to 1.0V) 0.2C $\geq 300\text{min}$ (0.2C discharge to 1.0V)
Max. Discharge Current	: 2.0C (continuous)



Trickle charge	: 18mA to 30 mA
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Operation temperatures	: 0°C to +45°C (standard charge)
(for recommended)	: +10°C to +45°C (fast charge)
	: 0°C to +60°C (discharge)
	: -20°C to +35°C (storage)



Performance and Quality Assurance

1. Scope

This Spec. Governs the performance of Nickel Metal Hydride Cylindrical cell and its stacked-up batteries. The nominal voltage of this type unit cell is 1.2V, and the voltage of the stacked-up batteries shall be equal to the value of the unit cell multiplied by the number of cells in the batteries, and the capacity shall be the capacity of the unitcell:

For example: 28AA6 00H, Batteries of 3 cell

Nominal voltage of unit cell: 1.2V

Voltage of the batteries $3 \times 1.2 = 3.6V$, Capacity of the battery: 600mAh

2. Ratings

The following is the basic item to rating a cell. May test the cell under demand.

Description	Unit	Specification	Conditions
Nominal Voltage	V/pack	3.6	Unit cell
Nominal Capacity	mAh	600	Standard charge and discharge
Standard Charge	mA	60(0.1C)	Ambient temperature $0 \sim 45^\circ\text{C}$
	hrs	16	
Fast Charge	mA	600 (1C)	$-\Delta V = 15 \sim 30\text{mV}$, ambient temperature $20 \pm 5^\circ\text{C}$ Timer = 120% nominal input TCO: $45 \sim 50^\circ\text{C}$ $-dT/dt = 0.8 \sim 1.0^\circ\text{C}/\text{min}$
	min	72	
Internal Resistance	m Ω /pack	≤ 120	at 1 kHz, fully charged 20°C
Cut-off Voltage	V/pack	3.0	/
Max. Discharge Current	mA	1200(2C)	Ambient temperature $0 \sim 60^\circ\text{C}$
Storage Temperature	$^\circ\text{C}$	$-20 \sim 35^\circ\text{C}$	Charges 80% nominal input
Average weight	g/pack	47.0	/

3. Performance

Except for special notice, the test should be carried out with a month after delivery under the following conditions:

The ambient temperature is: $20 \pm 5^\circ\text{C}$

The ambient humidity is $65 \pm 20\%$

The testing instrument must meet the following:

Voltmeter: IEC 485 prescribed 0.5 grade or more, resistance must be more than $10\text{K}\Omega/\text{V}$

Galvanometer: IEC 51/IEC 485 prescribed 0.5 grade or more, total resistance must be less than 0.001Ω

Ri ohmmeter: AC sine 1KHz, 4 terminal

Test	Unit	Specification	Conditions	Remarks
OCV	V/pack	≥ 3.75	With in 1hr after standard charge	
Capacity	mAh	≥ 600	Standard charge and discharge	Allow 3 cycles
Internal Impedance	m Ω /pack	≤ 120	Fully charged, Ambient temperature 20°C	
Self-discharge	mAh	$\geq 70\%$ Nominal Capacity	Standard charge, storage 28 days at 20°C, Standard discharge	
Humidity		Deformation	0.1C fully charged, $33 \pm 3^\circ\text{C}$, $80 \pm 5\%$ R.H., storage 14 day	
Over Charge		No rupture	0.5C for 3hrs	
Short circuit test		No rupture	Short circuit the battery with the load max 100 m Ω after standard charge	
IEC Cycles Life	cycle	≥ 500	IEC61951-2 (2001) 4.4.1	See note 1

4. Appearance

Cell should be without any cracking, rupture, dirt, shading, leakage and deformation.

5. Standard of quality assurance (AQL)

All tests should be done according the following methods (ref. MIL -STD -105E)

Number	Item of test	Sampling criteria	Standard of quality assurance
1.	Cosmetic	I grade	1.5
2.	Dimension	I grade	0.65
3.	Performance	I grade	0.4

Including: capacity, performance of charge and discharge at 25°C , open current voltage Internal resistance

6. Warranty

One year's guarantee is valid for the defects caused by processing and materials.

7. Caution

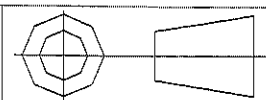
- 7.1 Do not dispose of cell into a fire or dismantled under any condition
- 7.2 Do not mix different cell types and capacities in the same battery assembly
- 7.3 Charge and discharge under specified current recommend to the specification
- 7.4 Short circuit leading to cell venting must be avoided
- 7.5 Never solder onto cell directly
- 7.6 Cell reversal should be avoided
- 7.7 Use batteries in extreme condition may affect the service life such as: extreme temperature, deep cycle, extreme overcharge and over discharge
- 7.8 Batteries should be stored in a cool, dry place Please discharge before mass storage or transportation
- 7.9 Once problems be found, stop using send batteries to local agent
- 7.10 Because the limit of the electrochemical system, charged the cell of 80%~100% nominal input

under long storage is recommended

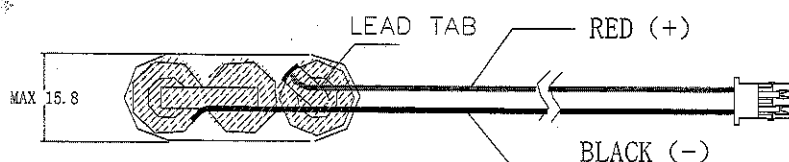
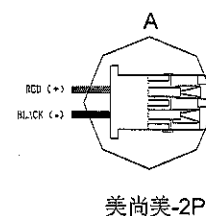
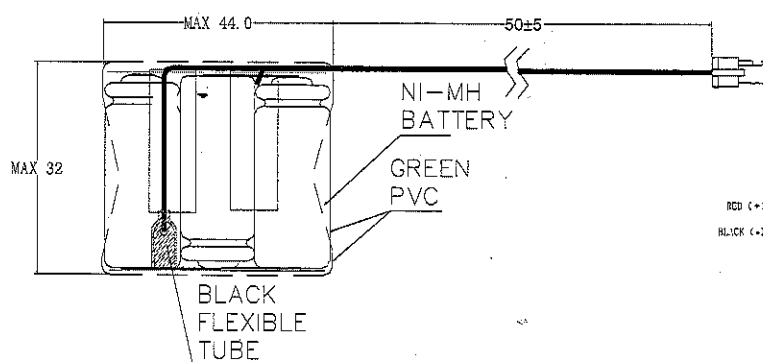
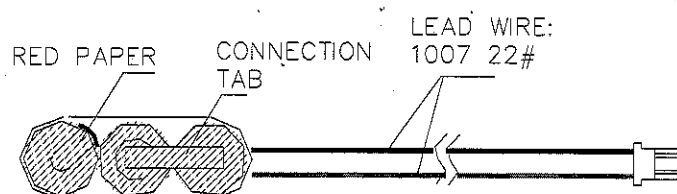
7.11 To maintain the performance of the cell stored for about 6 months, cycling(charging and discharging) the cell for several times is recommended

Note: IEC61951-2 (2001) 4.4.1 Cycle Life Test:

Cycle No.	Charge	Rest	Discharge
1	$0.1C \times 16\text{hrs}$	0	$0.25C \times 2\text{hrs } 20\text{min}$
2~48	$0.25C \times 3\text{hrs } 10\text{min}$	0	$0.25C \times 2\text{hrs } 20\text{min}$
49	$0.25C \times 3\text{hrs } 10\text{min}$	0	0.25C to 1.0V/cell
50	$0.1C \times 16\text{hrs}$	1~4hrs	0.20C to 1.0V/cell
Repeat 1 to 50 cycles, until the discharge time of a 50 th cycle is less than 3hrs			



单位: mm



		MODEL NO	3×28AA600			
		DRAW/DATE				
		CHKD/DATE				
CELL TYPE	NI-MH	APPD/DATE				
SPECIFICATIONS	28AA					
CAPACITY	600mAh	PAGE	DRAWING NO	EDITION	SCALE	
VOLTAGE	3.6V	1/1		A	1:1	