CHARACTERISTICS

FOR

NICKEL-METAL HYDRIDE
RECHARGEABLE BATTERY PACKS

MODEL AA x 3

Nominal Capacity: 1500 mAh

Ropla Elektronik Sp. z o.o.
Address: ul. Wrocławska 1C, 52-200 Suchy Dwór, Poland
www.ropla.eu

SPECIFICATION

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Date Dec. 11, 2019

Approval		
Master	**Check**	**Design**

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˙SPECIFICATION

Model		AA x 3
Nominal Voltage		3.6 V
Nominal Capacity		1500 mAh/0.2 CmA (single cell)
Charge	Standard	0.1 CmA for 16 hrs.
	Rapid	1C for 1.2 hrs.(approx.) (With-ΔV, Temp., Time charging control)
	Trickle	0.03CmA (1 month)
Maximum Discharge Current		1 CmA
Discharge Cut-off Voltage		3.0 V
Cycle Life		500 cycles (IEC60951-1)
Applicable Temperature	Standard Charge	0℃~+45℃
	Rapid Charge	0℃~+40℃
	Discharge	-20℃~+60℃
Storage	Within one year	-20℃~+35℃
	Within 3 months	-20℃~+45℃
	Within 1 month	-20℃~+55℃
Relative Humidity Range		65%±20%
Weight		Approx. 75g

1. Scope of Application

This specification is applied to Nickel-Metal Hydride Rechargeable battery packs, AA x 3.

(This specification is available only for the testing within one month since receipt of battery packs.)

2. General

(1) Type	: AA x 3
(2) Nominal Voltage	: 3.6 V
(3) Nominal Capacity	: 1500 mAh (0.1CmA for 16hrs/0.2CmA discharge)
(4) Standard Charge	: 0.1C mA x 16 hrs.
(5) Rapid Charge	: 1.0 CmA 1.2 hrs.(Maximum)
	: (with-ΔV charging control,-ΔV=5~10mV/cell)
(7) Trickle Charge	: 0.03 CmA(1 month)
(8) Maximum Discharge Current	: 1.0 CmA
(9) Discharge Cut-off Voltage	: 3.0 V
(10) Applicable Temp. Range	
Standard Charge	: 0℃~+45℃
Rapid Charge	: 0℃~+40℃
Discharge	: -20℃~+60℃
(11) Storage	
Within one year	: -20℃~+35℃
Within 3 months	: -20℃~+45℃
Within 1 month	: -20℃~+55℃
(12) Applicable Relative Humidity Range	: 65%±20%
(13) Weight	: approx. 75 g

3. Construction and Design

The battery pack is consisted of three (3) Ni-MH AA cells connected in series.

4. Electrical Characteristics

4-1. Terminal Voltage

Open circuit voltage (O.C.V.) shall be 3.75 V (minimum) within two weeks at room temperature after full charge.

4-2. Capacity

The battery packs deliver nominal 1500 mAh capacity at 0.1CmA charge rate for 16 hrs, then 0.2CmA discharge rate to 3.0 V. The actual capacity depends on the operating temperature and the cycling conditions.

4-3. Overcharge

(1) The battery packs are charged at 0.5 CmA for 3 hours. After charging, the packs show no change in the cell appearance, no leakage, and no fire or explosion.

(2) The battery packs are charged at less than 0.03 CmA for a long term (over one month). After charging, the packs show no change in the cell appearance, no leakage, and no fire or explosion.

4-4. Short Test

The battery packs are fully charged, then shorted by connecting the positive to the negative terminals. The battery discharging is cut off by the thermostat. The battery has no leakage observed, no change in the battery appearance, and no fire or explosion.

4-5. Self Discharge

(1) After one-month storage of a fully charged battery pack at room temperature (25°C), the capacity of battery pack has 60% of rated capacity, 0.2 CmA discharge to 6.0 V.

(2) After one-week storage of a fully charged battery pack at 45°C, the capacity of battery pack has 60% of rated capacity, 0.2 CmA discharge to 6.0 V.

4-6. Welding strength of the nickel terminals

Welding strength of nickel terminals is tested in perpendicular direction. The welding strengths are over 1 kgf.

4-7. Vibration Test (single cell)

Cells are tested as follows:

(1) Amplitude	: 3.6mm peak to peak
(2) Frequency	: 1000cpm
(3) Direction and time	: Arbitrary direction continuously for 1 hour.
(4) Performance	: The cell shall be normality in appearance and no leakage.

4.8 Shock Test(single cell)

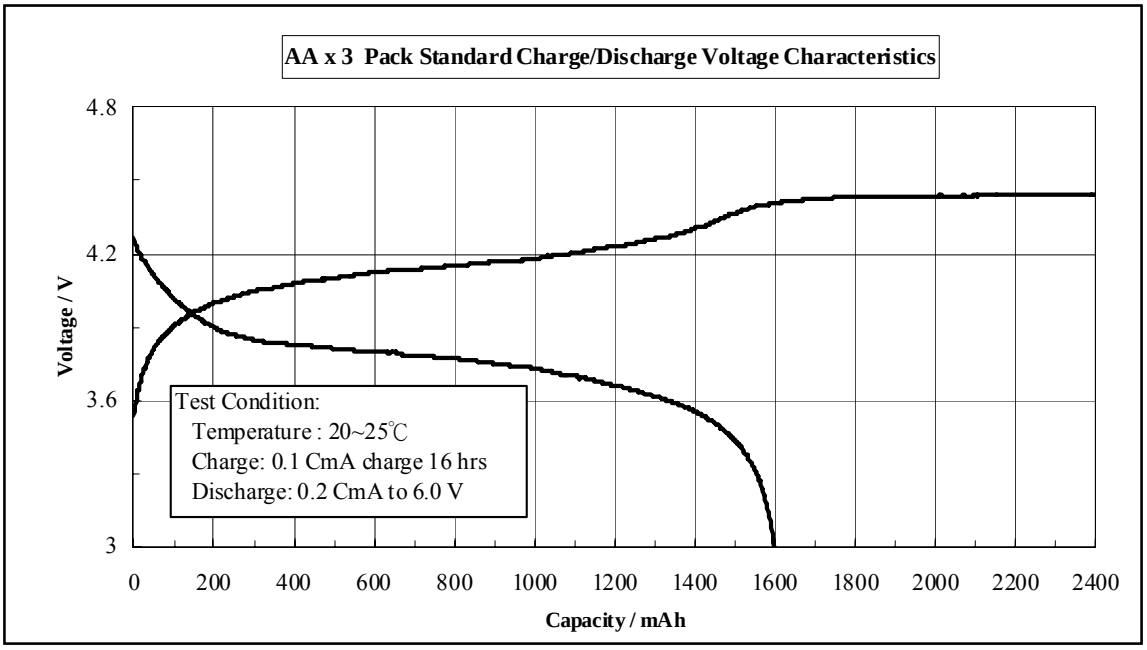
Cells are tested as follows:

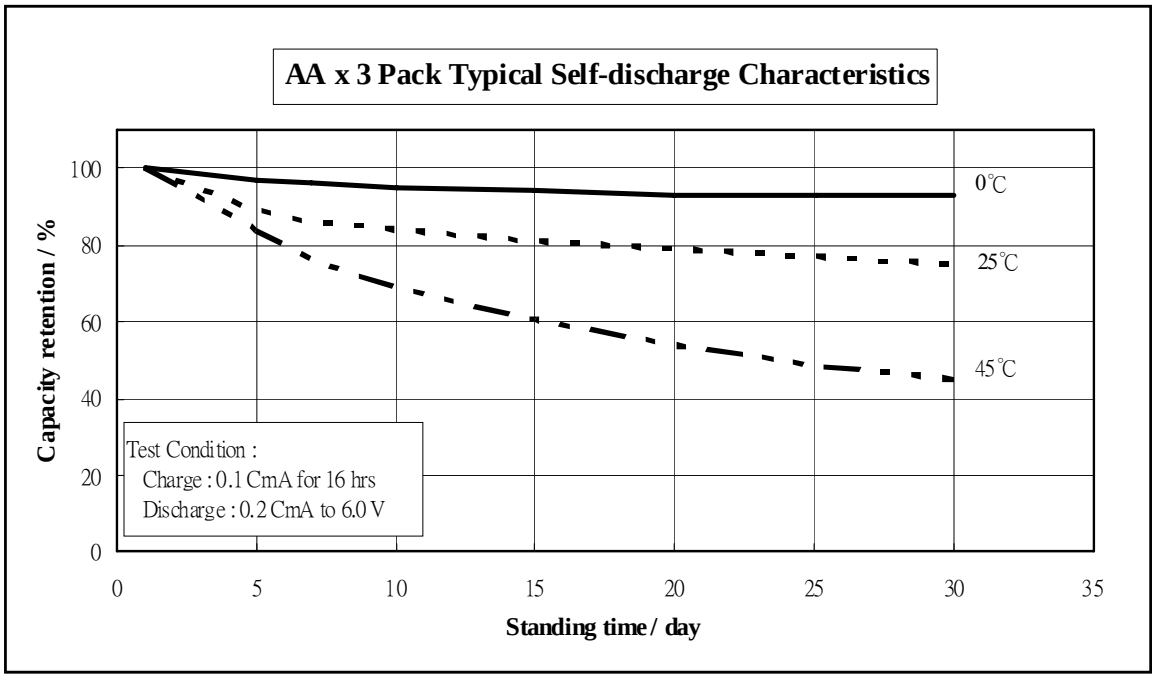
(1) Dropping Distance	: 0.45m (spontaneous dropping)
(2) Shock board	: Made of hard wood (Thickness: over 10mm)
(3) Dropping Time	: Arbitrary direction for 3 times.
(4) Performance	: The cell shall be normality in appearance and no leakage.

5. Safety Requirement for User

Please keep in mind the following points when operating, designing, or manufacturing your equipment:

1. Avoid short-circuiting of the battery pack. Do not connect the positive and the negative terminals with a wire or other metal items, as this will cause a large flow of current through the battery pack. It may damage the cells in the pack.
2. Do not attempt to take battery pack apart or subject to pressure or impact. The parts of the pack will be damaged, when the cells in the pack have ruptured, heat may be generated or fire may result. The alkaline electrolyte may harm the skin or eyes or damage clothing upon contact.
3. Do not heat or incinerate the battery pack. The battery may swell or rupture and it may explode or release alkaline electrolyte.
4. Do not solder directly to the battery. It may damage the battery.
5. If any abnormally or problem is found while using the battery pack, stop its use, and bring it to your local dealer. Please do not attempt to fix or take the battery pack apart. It may cause dangerous to you.
6. Charge the battery only with a charger specified by the manufacturer or with a charger that meets our specified conditions. Charging under other conditions can cause overcharging and loss of charging control, and can cause the battery to leak, overheat, burst, or catch fire.


AA x 3 Pack Standard Charge/Discharge Voltage Characteristics
Voltage / V
4.8
4.2
3.6
3
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Capacity / mAh
Test Condition:
Temperature : 20~25℃
Charge: 0.1 CmA charge 16 hrs
Discharge: 0.2 CmA to 6.0 V


AA x 3 Pack Typical Self-discharge Characteristics
Capacity retention / %
100
80
60
40
20
0
0
5
10
15
20
25
30
35
Standing time / day
0℃
25℃
45℃
Test Condition :
Charge : 0.1 CmA for 16 hrs
Discharge : 0.2 CmA to 6.0 V