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TECHNICAL CHARACTERISTICS

FOR

SEALED NICKEL-METAL HYDRIDE
RECHARGEABLE CELLS

MODEL MH-AA155



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1. Scope of Application

This battery specification applies to Maha MH-AA155 Sealed Nickel-Metal Hydride rechargeable cylindrical cells.

2. Nominal specification

(1) Type	: MH-AA155
(2) Nominal Voltage	: 1.2V/cell
(3) Typical Capacity	: 1550 mAh
(4) Minimum Capacity	: 1500 mAh
(5) Quick Charge	: 0.5CmA x 2~2.5 hours
(6) Standard Charge	: 0.1CmA x 16 hours
(7) Standard Discharge	: 0.2CmA to 1.0 V/cell
(8) Rapid Charge	: 1.0CmA x 1~1.2 hours (maximum) (with- ΔV charging control , - $\Delta V=5\sim 10\text{mV}$)
(9) Discharge Current	: 3.0CmA (maximum)
(10) Final Discharge Voltage	: 1.0V/cell
(11) Applicable Temp. Range	: 0~+45°C
Standard Charge	: 0~+40°C
Rapid Charge	: -20~+60°C
Discharge	: -20~+60°C
Storage	: -20~+40°C (Less than three months)
Long Storage	: -20~+30°C (Less than one year)
(12) Applicable Relative Humidity Range	: 20~85%
(13) Weight	: approx.26g

3. Design, Construction and Materials

- (1) Cell design and its overall dimension are listed in the specification sheet.
- (2) Cell consists of the positive and negative electrode, separator, electrolyte, cap and can. It has a sealed construction with an electrical insulator between the can and the cap.
- (3) Positive electrode is made of nickel hydroxide and negative electrode is made of hydrogen storage alloy.
- (4) Can and cap are made of nickel plated steel.
- (5) Cell has a safety valve in the cap.
- (6) Electrolyte is a mix solution of potassium hydroxide, sodium hydroxide, etc.

4. Appearance



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There should be no physical defects such as deformation, flaw, strain, discoloration or electrolyte leakage, which may adversely affect commercial value of the cell.

5. Performance

The performance of cells should comply with the specification below, when tested in accordance with test methods specified in Paragraph 6. Test must be conducted within one month after date of manufacture. The test should be conducted to one cell at a time unless otherwise specified.

6. Test condition

6.1 Capacity Test

Five cycles are planned for this test. The test shall be terminated at the end of the first cycle which meets the performance.

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|-----------------------------|--|
| (1) Charge | : Charged at a constant current of 0.1CmA for 16 hours |
| (2) Rest | : Cell is rested for 30 minutes. |
| (3) Discharge | : Discharged at a constant current of 0.2CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Ambient Temperature | : $25\pm 2^{\circ}\text{C}$ |
| (6) Performance | : At or above minimum cell capacity |

6.2 High Rate Discharge Test

- | | |
|-----------------------------|--|
| (1) Charge | : Charged at a constant current of 0.1CmA for 16 hours |
| (2) Rest | : Cell is rested for 30 minutes. |
| (3) Discharge | : Discharged at a constant current of 1.0CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Ambient Temperature | : $25\pm 2^{\circ}\text{C}$ |
| (6) Performance | : Discharge time is 50 minutes or longer |

6.3 High Temperature High Rate Charge Test

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|-----------------------------|--|
| (1) Charge | : Charged at a constant current of 1.0CmA with charge control and 40°C |
| (2) Rest | : Cell is rested at $25\pm 2^{\circ}\text{C}$ for 3 hours |
| (3) Discharge | : Discharged at a constant current of 1.0CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |



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(5) Performance : Discharge time is 50 minutes or longer

6.4 Low Temperature High Rate Charge Test

(1) Charge : Charged at a constant current of 1.0CmA with charge control and 0°C
(2) Rest : Cell is rested at 25±2°C for 3 hours
(3) Discharge : Discharged at a constant current of 1.0CmA
(4) Final Discharge Voltage : 1.0V/cell
(5) Performance : Discharge time is 45 minutes or longer

6.5 High Temperature High Rate Discharge Test

(1) Charge : Charged at a constant current of 1.0CmA with charge control and 25±2°C
(2) Rest : Cell is rested at 40°C for 3 hours
(3) Discharge : Discharged at a constant current of 1.0CmA
(4) Final Discharge Voltage : 1.0V/cell
(5) Performance : Discharge time is 50 minutes or longer

6.6 Low Temperature High Rate Discharge Test

(1) Charge : Charged at a constant current of 1.0CmA with charge control and 25±2°C
(2) Rest : Cell is rested at 0±2°C for 3 hours
(3) Discharge : Discharged at a constant current of 1.0CmA
(4) Final Discharge Voltage : 1.0V/cell
(5) Performance : Discharge time is 45 minutes or longer

6.7 Open Circuit Voltage Test

The Open Circuit Voltage (O.C.V.) measured within 14 days after fully charged in 25±2°C should be over 1.25V.

6.8 Cycle Life Test

Charge and discharge condition:

(1) Charge : 0.5CmA charge to full capacity
(2) Rest : Initially discharged in 30 minutes stand after a full charge



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|-----------------------------|--|
| (3) Discharge | : Discharged at a constant current of 0.5CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Ambient Temperature | : 25±2°C |

Capacity is measured every 50 cycles of charge and discharge. Capacity is measured under the conditions specified below:

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|-----------------------------|---|
| (1) Charge | : Charged at a constant current of 0.1CmA for 16 hours |
| (2) Rest | : Cell is rested for 30 minutes between charge and discharge. |
| (3) Discharge | : Discharged at a constant current of 0.2CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Ambient Temperature | : 25±2°C |
| (6) Performance | : No less than 80% of minimum capacity after 500 cycles |

6.9 Self-discharge Test

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|-----------------------------|--|
| (1) Charge | : Charged at a constant current of 0.1CmA for 16 hours |
| (2) Storage | : 30 days at 25±2°C |
| (3) Discharge | : Discharged at a constant current of 0.2CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Performance | : Discharge time is at 210 minutes or longer |

6.10 Overcharge Test

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|-----------------------------|--|
| (1) Charge | : Charged at a constant current of 0.1CmA for 48 hours |
| (2) Rest | : Cell is rested for 30 minutes |
| (3) Discharge | : Discharged at a constant current of 0.2CmA |
| (4) Final Discharge Voltage | : 1.0V/cell |
| (5) Ambient Temperature | : 25±2°C |
| (6) Performance | : At or above minimum capacity |

6.11 Leakage Test

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|------------|--|
| (1) Charge | : Charged at a constant current of 0.1CmA for 16 hours |
|------------|--|



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|-----------------|--|
| (2) Storage | : 14 days in $35\pm 2^{\circ}\text{C}$ and $80\pm 5\%\text{R.H}$ |
| (3) Performance | : No visible leakage |

6.12 Internal Impedance

- | | |
|-------------------------|---|
| (1) Charge | : Charged at a constant current of 0.1CmA
for 16 hours |
| (2) Rest | : Cell is rested for 60 minutes |
| (3) Frequency | : 1.0 KHz |
| (4) Ambient Temperature | : $25\pm 2^{\circ}\text{C}$ |
| (5) Performance | : 25 m Ω or below |

6.13 Safety Test

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|-----------------------------|---|
| (1) Charge | : Charged at a constant current of 0.1CmA
for 16 hours |
| (2) Rest | : Cell is rested for 30 minutes. |
| (3) Discharge | : Discharged at a constant current of 2.0CmA |
| (4) Final Discharge Voltage | : 0V/cell |
| (5) Over-discharge | : Over-discharged at a constant current of
1.0CmA for 1 hour |
| (6) Ambient Temperature | : $25\pm 2^{\circ}\text{C}$ |
| (7) Performance | : The safety valves will be activated |

6.14 Vibration Test

- | | |
|-------------------------|--|
| (1) Amplitude | : 4.0mm peak to peak |
| (2) Frequency | : 1000 cycle/min |
| (3) Direction and time | : Arbitrary direction continuously for
60 minutes |
| (4) Ambient Temperature | : $25\pm 2^{\circ}\text{C}$ |
| (5) Performance | : No mechanical or electrical change
in cell |

6.15 Shock Test

- | | |
|-----------------------|---|
| (1) Dropping Distance | : 45 cm. |
| (2) Shock board | : Made of hard wood
(Thickness : over 1.0 cm.) |
| (3) Dropping Time | : Arbitrary direction for 3 times |



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(4) Ambient Temp.	: $25 \pm 2^{\circ}\text{C}$
(5) Performance	: No change in cell appearance No explosion or leakage

7. Precautions and prohibition to ensure the safety on handling battery

Maha is not responsible for any direct and indirect damage caused by the mishandling of batteries, including but not limited to the following:

- Disposal of in fire, or water
- Subjecting cell to heat
- Reverse polarity
- Overcharge or charge under high current
- Use of chargers other than ones that are specified
- Short
- Disassembling of cell
- Direct soldering
- Airtight applications
- Use for application or purpose other than the ones listed in this handbook
- Mixing with other types cells

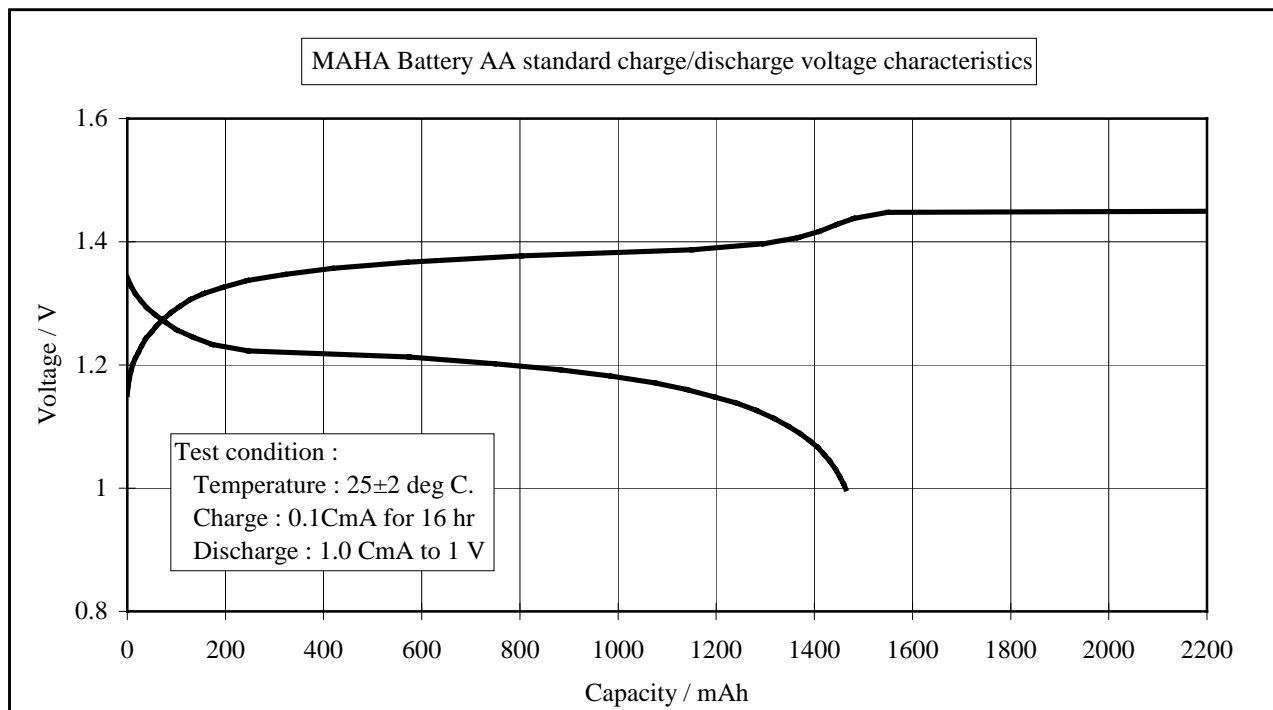
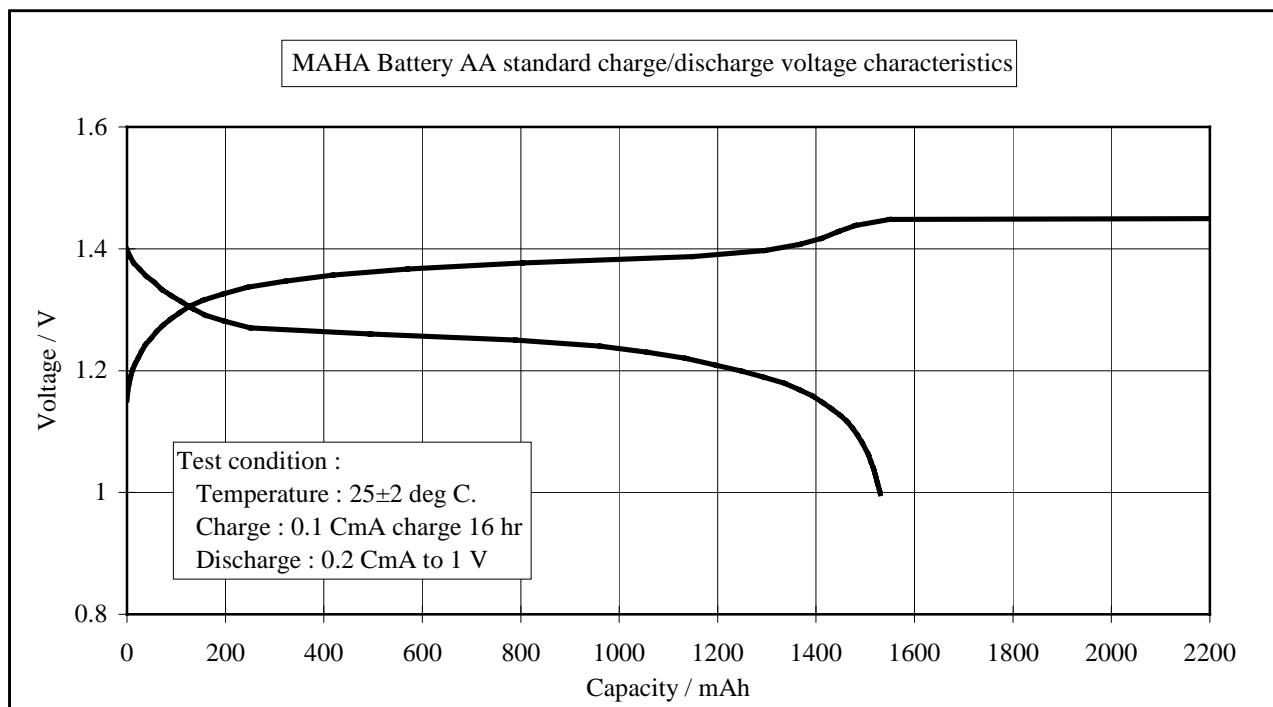
8. Shipping Condition

The cell are in partially charged condition when packaged.



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9. Test Result Diagrams





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