

1. Scope

This specification is applicable to rechargeable NiMH battery, distributed under brand name EMOS.

Model: EMOS Rechargeable 2700

2. Law & Regulation Compliances:

This product complies with EU's battery directive (2006/66/EC).

3. General

Nominal Voltage	1.2 V
Nominal	2600 mAh
Minimum	2510 mAh/0.2C
Standard charge rate	260 mA × 16h
Rapid charge rate	780 mA x 270min

(Stop when voltage reduce to 5mV)

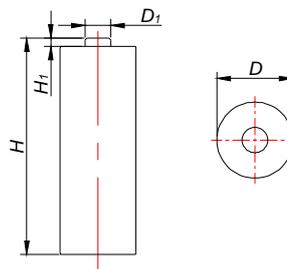
Value of dT/dt (for reference only) 1 to 2 °C/min

Operating temperature range	Humidity: +65%± 20%
Standard charge	0 to +45°C (32 to 113°F)
Rapid charge	0 to +40°C (32 to 104°F)
Discharge	-10 to +55°C (14 to 149°F)
Storage temperature range	Humidity: +65%±20%
Within 1 year	-20 to +35°C (-4 to 95°F)
Within 6 months	-20 to +45°C (-4 to 113°F)
Within 1 month	-20 to +55°C (-4 to 131°F)
Within 1 week	-20 to +55°C (-4 to 149°F)

- Note:
- (1) Specified capacity figures are based on single cell performance.
 - (2) All rapid charge systems should be discussed with our engineer.
 - (3) We stipulate to charge only 30% fully power for delivery, while only 50% for blister with 2pcs or below, and only 30% with over 2pcs. If customer requires charged power to exceed what we stipulate, EMOS won't be responsible for this during delivery and storage.
 - (4) shelf life: 12 months.

3. MEASUREMENT & DIMENSIONS to see the drawing:

D	13.8~14.5mm
H	49.0~50.5mm
D1	5.4±0.2mm
H1	1.5±0.3mm



4. PERFORMANCE TESTING

4.1. Test conditions

4.1.1 The battery to be tested is the product within one month after being received by customer.

4.1.2 Ambient conditions:

Temperature	+20°C °C±5
Humidity	+65%±20%

4.2. Testing Tools

4.2.1 Voltage meter: 0.5 level or higher as required in IEC51/IEC485. Internal impedance exceeds 10KΩ/V.

4.2.2 Current meter:

0.5 level or higher as required in IEC51/IEC485. Internal impedance should be less than 0.01Ω/V (including wires).

4.2.3 Micrometer caliper: With precision of 0.02mm.

4.2.4 Internal impedance meter:

Alternating current of 1000HZ, connector measuring equipment with sin wave of 4.

4.2.5 Impedance loaded meter:

Value of impedance is with ±5% error allowed (including external wires).

4.2.6 Incubators: Accuracy ±2°C

4.3. Test methods and benchmarks

Item	Test Method	Benchmark
1. Appearance:	eyeballing	batteries shall be free from any stains; scratches or deformations, which may reduce the commercial value when visually inspected
2. Size:	caliper measurement	The size shall comply with the specified size as the attached drawing

3. Insulate impedance	measured with a Megger overpack and battery electrode between the degree of insulation	outer sleeve shall exceed 10 MΩ
4. Weight	using disk-scale measurement	approximate 30.5 g
5. Charge Voltage	Following a period of discharge at 0.2CmA down to a terminal voltage of 1.0V, standard charge, the cell or battery shall be checked at 5 minutes before finish charging	The voltage shall be less than 1.6 V
6. Open circuit voltage: (O.C.V.)	Following a standard charge period, the open circuit voltage of the cell or battery shall be checked within 1 hour.	The O.C.V. shall exceed 1.25 V per cell.
7. Closed circuit voltage: (CCV)	Following a standard charge period, the closed-circuit voltage of the cell or battery shall be checked with a 0.86 Ω per cell load within 1 hour	The C.C.V. shall exceed 1.2 V per cell
8. Internal impedance	Following a standard charge period, the internal impedance of the cell or battery shall be checked at 1000Hz within 1 hour	The internal impedance shall not be more than 30 mΩ per cell.
9. capacity	Following a standard charge period, the cell shall be stored for a period of 1 hour. The capacity shall be equal or more than minimum capacity when discharged at 0.2C mA down to a terminal voltage of 1.0V; The capacity returned might not initially attain the specified value following the first charge –discharge cycle. In this event, the test may be repeated a further two or three times to attain the minimum capacity	The capacity is greater than or equal to the minimum capacity
10. High Drain Discharge	To discharge by 0.5C to 1.0V within 1 hour after standard charge	The Capacity is higher than or equal to 114 min

11. Over-charge	Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, standard charge and then charge for 48hrs at 0.1C mA. The capacity of the cell or battery shall not be less than the rated capacity when discharged at 0.2C mA	It shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
12. Over-discharge	Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, combine the cells with a 0.86 Ω per cell load. After stored for a period of 24 hours, standard charged and then discharge at 0.2C mA	The cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed, and the subsequent capacity shall not be less than 80% of rated capacity
13. Self discharge	Following a period of discharge at 0.2C mA down to a terminal voltage of 1.0V, standard charge and then the cell or battery shall be stored for 28 days below 20°C	The subsequent capacity shall not be less than 60% of rated capacity when discharged at 0.2C mA
14. Cycle Life	† Based on clause 7.4.1.1, IEC619512 2003	† The charge-discharge cycles shall exceed <u>500</u> times.
15. Humidity	† Standard charge and store for 14 days under the following storage conditions: 33°C±3°C (91.4°F± 5.4°F) , Relative humidity of 80% ±5%. (Salting is permitted).	† No leakage of electrolyte in liquid form shall be observed.
16. Vibration	† Store the cell or battery more than 24 hours after standard charge, following vibration tests over an amplitude of 4 mm (0.1575 inches) at a frequency of 16.7 Hz (1000 cycles per minute) and repeated through any axes during 60mins.	† The subsequent fluctuation of open circuit voltage and internal impedance shall be less than <u>0.02</u> V and <u>5</u> m Ω respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed. .

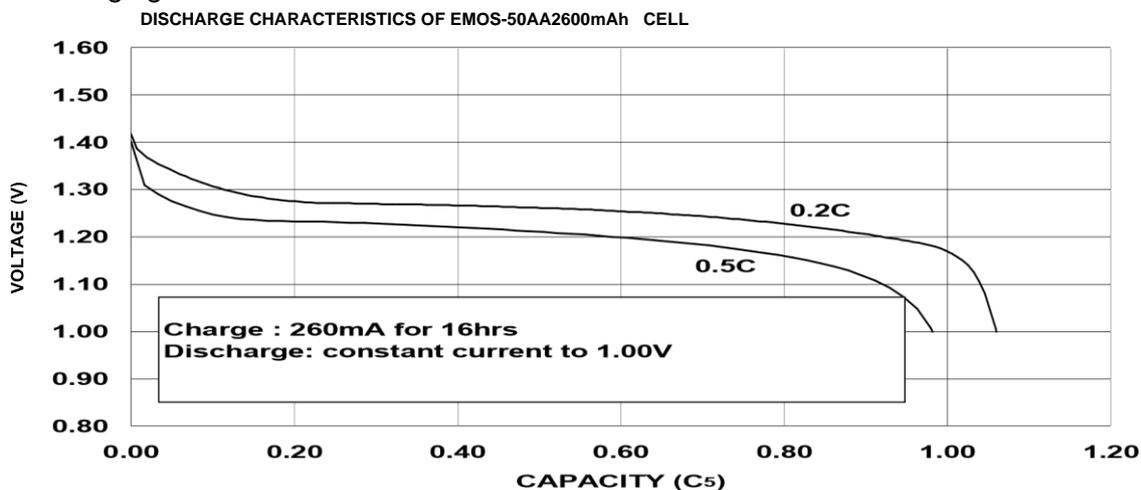
17. Free falling: (Drop)	† Store the cell or battery more than 24 hours after standard charge, following a drop test from 450mm (17.717 inches) on to a hard-wood board in a vertical axis 2 times on each of 2 mutually perpendicular axes,	† The subsequent fluctuation of open circuit voltage and internal impedance shall be less than <u>0.02</u> V and <u>5</u> mΩ respectively, and the cell or battery shall not be externally deformed and no leakage of electrolyte in liquid form shall be observed.
18. Short-circuit testing	† to store it for 1 hour after standard charged, and to make positive and negative electrode short-circuit with a wire with the section 0.75mm ² min and shortest length, the short-circuit time is 1 hour	† It shall not explode during or at the end of a 1 hour short-circuit test. However, leakage of electrolyte, external deformation or outer sleeve cracking is permitted.
19. Safety Valve Performance (Over discharging)	† to be discharged with <u>1C</u> mA for 5 hours	† safety valve can work normally, no breakage, leakage, distortion and out package breakage are allowed
20. Safety Valve Performance (over charging)	† to be charged with <u>1C</u> mA for 5 hours	† No explosion, but leakage, distortion and out package breakage are allowed
21. To discharge at low temperature	† to be stored for 24 hours at 0°C±2 °C, and discharged at <u>0.2C</u> mA at 0°C±2°C.	† discharge duration shall exceed <u>3</u> hour <u>30</u> min.

5. THE TRANSPORTATION A STORAGE

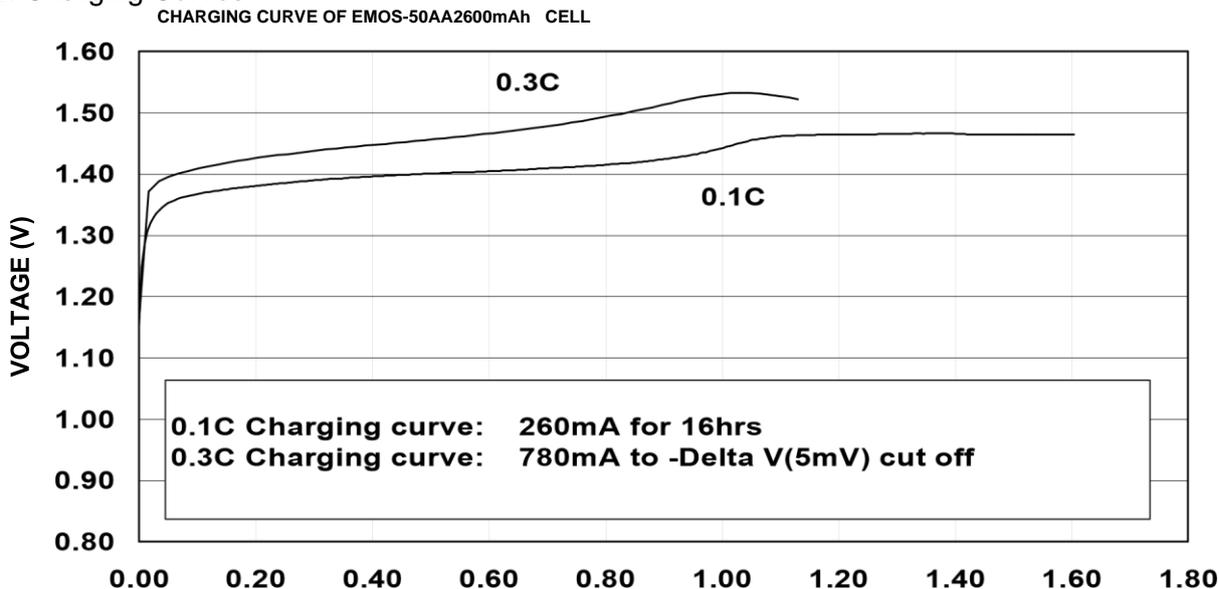
- 5.1. During transportation, it should be prevented from fierce vibration, impact, extrusion, insulating or drenching under clean, dry, and ventilated place. Applicable in transportation by automobile, train, steamboat, and airplane.
- 5.2. It must be stored at -20 °C ~ +35 °C, and put in the clean, dry and ventilated place with relative humidity 75% max. It must be kept away from corrodent substance, fire hazard and heat resource.

6. DISCHARGING AND CHARGING CURVES

6.1. Discharging Curves



6.2. Charging Curves



7. OTHERS

- 7.1. EMOS reserve right to revise the specification without notification.
- 7.2. Anything not mentioned in this specifications, customer and EMOS should discuss to get a solution.
- 7.3. EMOS does not undertake any responsibility for the accidents caused by actions not matching with specifications.

8. Safety instructions

1. Batteries should be charged prior to use.
2. When using a new battery for the first time or after long term storage, please fully charge the battery before use.
3. For charging methods please reference to above tables
4. Use the correct charger for Ni-Cd or Ni-MH batteries.
5. Do not reverse charge batteries.
6. Do not short circuit batteries, permanent damage to batteries may result.
7. Do not incinerate or mutilate batteries, may burst, or release toxic material.
8. Do not solder directly to cells or batteries.
9. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive overcharge/overdischarge.
10. Store batteries in a cool dry place.
11. Do not mix new batteries in use with semi-used batteries or batteries of a different chemistry, over-discharge may occur.
12. Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise, batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
13. When connecting a battery pack to a charger, ensure correct polarity.
14. If find any noise, excessive temperature, or leakage from a battery, please stop its use.
15. When the battery is hot, please do not touch it and handle it, until it has cooled down.
16. Do not remove the outer sleeve from a battery pack nor cut into its housing.
17. When find battery power down during use, please switch off the device to avoid overdischarge.
18. When not using a battery, disconnect it from the device.
19. Unplug a battery by holding the connector itself and not by pulling at its cord.
20. After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
21. Never put a battery into water or seawater.
22. During long term storage, battery should be charged and discharged once every 3 months.
23. Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
24. Keep away from children. If swallowed, contact a physician at once.