Specification of “Size 10” rechargeable NiMH cell for hearing aids

Requirements:

Type Number:	54610
UL Recognition	File MH13654
Technology:	Nickel Metal Hydride
Nominal voltage:	1.2 V
Nominal capacity:	10 mAh
Typical capacity:	11 mAh (after standard charge 16h/1 mA, discharge @ 2 mA up to 1.0 V, at 23°C)
Internal Resistance DC, fully charged:	12 - 16 Ohm
Impedance AC at 1 kHz, fully charged:	1.5 – 3.0 Ohm
Dimensions:	similar (“size 10”) Zinc-Air cell
Diameter:	5.8 mm
Height (max. at delivery):	3.60 mm
Volume:	0.09 cm³
Weight approx:	0.3 g
Energy density approx:	146Wh/L

Temp. range:

Charge:	0 to +50 °C
Discharge:	-20 to +50 °C (full capacity from 0 to +50 °C; charge 0.2 CA for 7h @ RT)
Storage:	-40 to +50 °C

Charging method:

Recommended charging:	Temperature compensated CC-CV charge (for fhurter information please consult VARTA)
Standard Charging:	0.1CA (1 mA) for 16h
Accelarated charging:	0.2CA (2mA) for 7h (time controlled, max. voltage 1.60 volt)

Fast charging:	0.5 CA (5 mA) for 2.5 h (time controlled; after full discharge, limited to room temperature, max. voltage 1.65 volt) Note: excessive overcharge lead to cell swelling and increase the internal resistance.
Overcharge:	continuous 0.1 CA up to 1 year @ RT
Charge retention:	>80% of nominal capacity after 1 month storage at 20°C
Cycle life:	> 500 cycles according to IEC 61951-2
Swelling:	Dependent on the overcharge current and the ambient temperature the cell thickness can temporary exceed the max. value of 3.60mm. Overcharge @ 0.1CA max. thickness 3.65 mm Overcharge @ 0.2CA max. thickness 3.70 mm Overcharge @ 0.5CA max. thickness 3.80 mm

Deflection space in battery compartment has to be considered accordingly in hearing aids

Note: cell swelling in above range is no indication for cell failure and has no impact for life expectancy.

Further characteristics:

All other characteristics not specifically mentioned in this document should comply with characteristics of Varta Microbattery's standard program of rechargeable NiMH button cells as described in "High Performance Rechargeable Ni-MH Button Cells, Sales program and Technical Handbook", published June 2004.