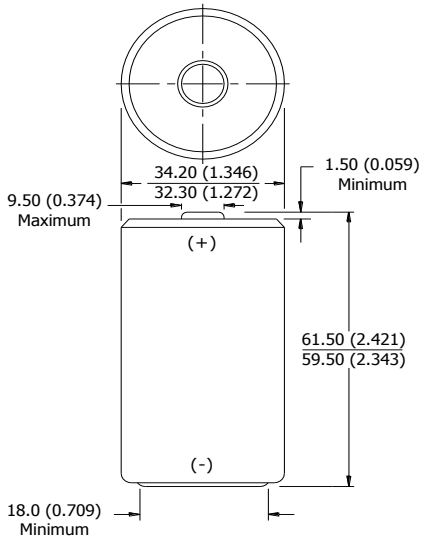
ENERGIZER NH50-2500 (HR20)

D

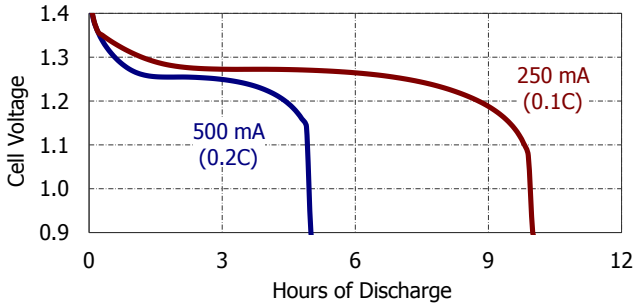
Industry Standard Dimensions

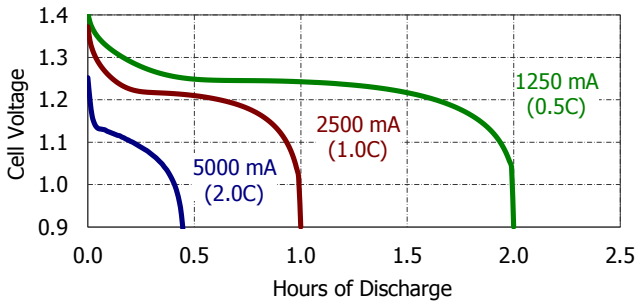
mm (inches)



Discharge Characteristics

Typical Performance at 21ºC (70ºF)





Specifications

Classification:	Rechargeable
Chemical System:	Nickel-Metal Hydride (NiMH)
Designation:	ANSI-1.2H4
Nominal Voltage:	1.2 Volts
Rated Capacity:	2500 mAh* at 21°C (70°F)
Typical Weight:	73.0 grams (2.6 oz.)
Typical Volume:	57.0 cubic centimeters (3.5 cubic inch)
Terminals:	Flat Contact
Jacket:	Plastic

* Based on 500 mA (0.2C rate) continuous discharge to 1.0 volts.

Internal Resistance:

The internal resistance of the cell varies with state of charge, as follows:

Cell Charged	Cell 1/2 Discharged
11 milliohms	21 milliohms

(tolerance of ±20% applies to above values)

AC Impedance (no load):

The impedance of the charged cell varies with frequency, as follows:

Frequency (Hz)	Impedance (milliohms) (charged cell)
1000	9

Above values based on AC current set at 1.0 ampere.
Value tolerances are ±20%.

Operating and Storage Temperatures:

To maintain maximum performance, observe the following general guidelines regarding environmental conditions:

Charge:	0ºC to 40ºC (32ºF to 104ºF)
Discharge:	0ºC to 50ºC (32ºF to 122ºF)
Storage:	-20ºC to 30ºC (-4ºF to 86ºF)
Humidity:	65±20%

NOTE: Operating at extreme temperatures, will significantly impact battery cycle life.

Important Notice

This data sheet contains typical information specific to products manufactured at the time of its publication.

Battery Cross Sectional Drawing

Nickel-Metal Hydride Rechargeable

Energizer

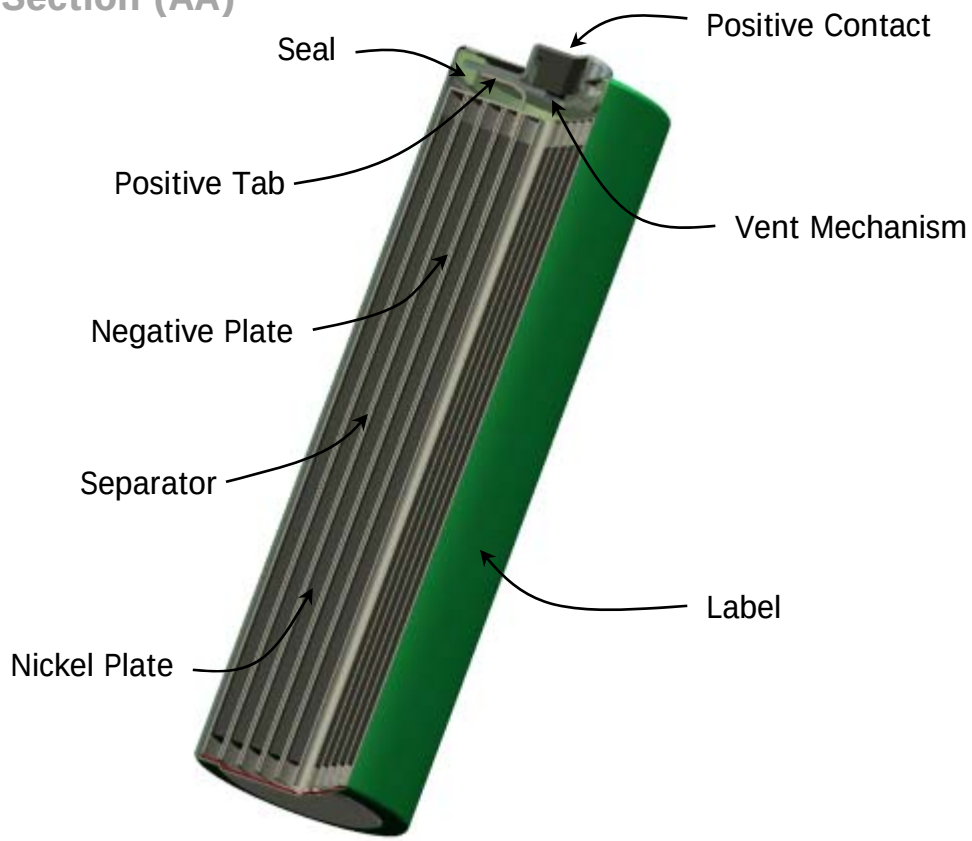
Cross Section

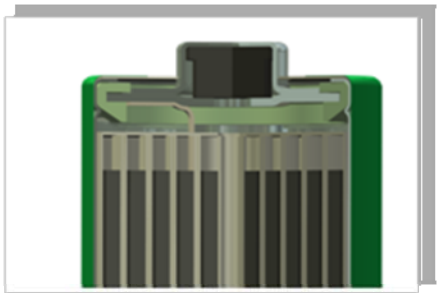
Energizer Battery Manufacturing Inc.

Overview

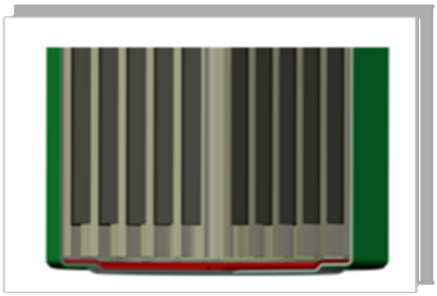
The nickel-metal hydride rechargeable battery is currently finding widespread application in high end portable electronic products where battery performance parameters, notably runtime, are a major consideration.

Cross Section (AA)





Additional View (1)
Positive end



Additional View (2)
Negative End

Principal Dry Battery Systems

Typical Characteristics

	Nickel-Metal Hydride (NiMH)	**Zinc Chloride** (Zn/MnO_2)	**Alkaline Manganese Dioxide** (Zn/MnO_2)	**Lithium** (Li/FeS_2)	**Silver Oxide** (Zn/Ag_2O)	**Zinc Air** (ZnO_2)	**Lithium Coin** (Li/MnO_2)	**Lithium** (Li/MnO_2)
Electrochemical System	Nickel-Metal Hydride	Zinc-Manganese Dioxide	Zinc-Alkaline Manganese Dioxide	Lithium-Iron Disulfide	Zinc-Silver Oxide	Zinc-Oxygen	Lithium Manganese Dioxide	Lithium Manganese Dioxide
Voltage per Cell	1.2	1.5	1.5	1.5	1.5	1.4	3.0	3.0
Negative Electrode	Metal Hydride	Zinc	Zinc	Lithium Metal	Zinc	Zinc	Lithium Metal	Lithium Metal
Positive Electrode	Nickel Hydroxide	Manganese Dioxide	Manganese Dioxide	Iron Disulfide	Silver Oxide	Oxygen	Manganese Dioxide	Manganese Dioxide
Electrolyte	20% to 40% weight % solution of potassium hydroxide	Aqueous solution of zinc chloride (may contain some ammonium chloride)	Aqueous solution of potassium hydroxide	Lithium Salt in organic solvent	Aqueous solution of potassium hydroxide or sodium hydroxide	Aqueous solution of potassium hydroxide	Lithium Salt in organic solvent	Lithium Salt in organic solvent
Recharge	Yes	No	No	No	No	No	No	No
Overall Reaction Equations	$MH + NiOOH \rightarrow M - Ni(OH)_2$	$Zn + 2MnO_2 + 2H_2O + ZnCl_2 \rightarrow 2MnOOH + 2Zn(OH)Cl$	$3MnO_2 + 2Zn \rightarrow Mn_3O_4 + 2ZnO$	$4Li + FeS_2 \rightarrow 2Li_2S + Fe$	$Zn + Ag_2O \rightarrow ZnO + 2Ag$	$2Zn + O_2 \rightarrow 2ZnO$	$Li + Mn^{IV}O_2 \rightarrow Mn^{III}O_2(Li^+)$	$Li + Mn^{IV}O_2 \rightarrow Mn^{III}O_2(Li^+)$
Typical Commercial Service Capacities	850 mAh to 2500 mAh	Several Hundred mAh to 38 Ah	30 mAh to 24 Ah	25 mAh to 3000 mAh	5 mAh to 200 mAh	90 mAh to 620 mAh	30 mAh to 620 mAh	800 mAh to 1500 mAh

Principal Dry Battery Systems

Typical Characteristics

	Nickel-Metal Hydride (NiMH)	**Zinc Chloride** (Zn/MnO_2)	**Alkaline Manganese Dioxide** (Zn/MnO_2)	**Lithium** (Li/FeS_2)	**Silver Oxide** (Zn/Ag_2O)	**Zinc Air** (ZnO_2)	**Lithium Coin** (Li/MnO_2)	**Lithium** (Li/MnO_2)
Discharge Curve (shape)	Flat	Sloping	Sloping	Flat	Flat	Flat	Flat	Flat
Temperature Range (storage)	5°C to 35°C (41°F to 95°F)	5°C to 35°C (41°F to 95°F)	-5°C to 35°C (41°F to 95°F)	5°C to 35°C (41°F to 95°F)	5°C to 35°C (41°F to 95°F)	10°C to 30°C (40% to 70%RH)	5°C to 35°C (41°F to 95°F)	5°C to 35°C (41°F to 95°F)
Temperature Range (operating)	Discharge 0°C to 50°C (32°F to 122°F)	-18°C to 55°C (0°F to 130°F)	-18°C to 55°C (0°F to 130°F)	-40°C to 60°C (-40°F to 140°F)	-10°C to 55°C (14°F to 130°F)	-10°C to 55°C (14°F to 130°F)	-30°C to 60°C (-22°F to 140°F)	-40°C to 60°C (-40°F to 140°F)
Effect of Temperature on Service Capacity	Fair Low Temperature	Poor Low Temperature	Good Low Temperature	Excellent Low Temperature	Good Low Temperature	Good Low Temperature	Excellent Low Temperature	Excellent Low Temperature
Shelf Life at 20°C	5 Years	Up to 3 Years	5 to 12 Years	20 Years	Up to 5 Years	4 Years	10 Years	10 Years