



MATERIAL SAFETY DATA SHEET

Secondary Sealed Nickel-Metal Hydride Rechargeable Batteries

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Section 1 - Product Identification

Product: Secondary Sealed Nickel-Metal Hydride Rechargeable Batteries
Trade Name: Power-Sonic
IEC Designation: HR.....according to International Standard IEC 285
Electrochemical System: Nickel-Metal Hydride, alkaline electrolyte
Nominal Voltage: 1.2V
Electrodes: Positive Nickel Hydroxide, negative Metal Hydride
Electrolyte: Potassium Hydroxide water solution.

Section 2 - Hazardous Ingredients/Identity Information

Components	CAS Number	OSHA PEL ($\mu\text{g}/\text{m}^3$)	ACGIH TLV (μ/m^3)
Nickel (powder)	7440-02-0	1 TWA	1 TWA
Nickel Hydroxide	12054-48-7	1 TWA	1 TWA
Cobalt	7440-48-4	0.1 TWA	Dust & Fumes 0.005
Manganese	7439-96-5	Fume: 5 Ceiling Limit	Dust: 5 Fumes: 1
Lanthanum	7439-91-0	N/A	N/A
Cerium	7440-45-1	N/A	N/A
Neodymium	7440-00-8	N/A	N/A
Potassium Hydroxide	1310-58-3	N/A	2 Ceiling Limit
Sodium Hydroxide	1310-73-2	2 TWA	2 Ceiling Limit
Lithium Hydroxide	1310-65-2	N/A	N/A

Notes: 1. Concentration may vary depending on the stage of charge or discharge.
2. TWA is the Time Weighted Average concentration over an 8-hour period

Section 3 – Physical Composition

Metal	% by Weight
Iron (Fe)	23-27
Nickel (Ni)	17-23
Metal Hydride (MH)	25-35
Cobalt (Co)	0.4-1.0
Plastics	% by Weight
Polypropylene (PP)	2.5-3.5
Rubber (EPDM)	<0.05
Polyethylene (PE)	0.2-0.4
PVC	0.5-0.7
Other	% by Weight
Potassium (K)	1.8-2.5
Water (H ² O)	4-7
Hydroxide (OH)	9-11

Section 4a – Flammability Data

Melting Point (°F) N/A	Vapor Pressure (mm Hg) N/A	Specific Gravity (H ² O) N/A
Boiling Point (°F) N/A	Evaporation Rate N/A	Solubility in Water N/A
% Volatile by Volume N/A	Vapor Density (Air=1) N/A	Appearance and Odor Geometric solid object no odor

Section 4b – Fire and Explosion Hazard Data

Flash Point: N/A	Lower Explosion Limit: N/A	Upper Explosive Limit: N/A	Flammable Limits in Air(%): N/A
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In the case of fire, use a smothering agent such as dry sand, Class D Dry chemical, dry ground dolomite, soda ash or CO². If you use water, use enough to smother the fire. Using an insufficient amount of water could possibly make the fire worse. Cooling the exterior of the batteries will help prevent rupturing. Burning of the batteries will generate toxic fumes.

FIRE FIGHTERS SHOULD USE SELF-CONTAINED BREATHING APPARATUS.

Exposure to temperatures above 212 °F can cause venting of the liquid electrolyte, internal shorting could also cause venting of the electrolyte. There is potential for exposure to iron, nickel, cobalt, rare earth metals (cerium, lanthanum, neodymium and praseodymium), manganese and aluminum fumes during a fire.

Section 4c – Spill Management Procedure

The sealed NiMH cells when sleeved are safe if spilled. Non sleeved cells may generate short- circuits, causing release of alkaline electrolyte mist or liquid. Electrolyte reacts with zinc, aluminum, tin and other active materials releasing flammable hydrogen gas. In such case, use self contained breathing apparatus and protective clothing.

Section 5 - Health Hazard Data

Human Hazards

A Sealed Nickel-Metal hydride cell is not hazardous to humans in normal use.

Threshold Limit Value (TLV) and Source: N/A

Physical

Nickel plated steel does not present any risk providing the cells are used for their intended purpose and according to valid directions for use.

Chemical

In normal use there is no chemical risk. Should the battery be misused (abusive overcharge, reverse charge, external short circuit etc.) some electrolyte may leak from the cell through the safety vent. See Section 6 below for suggested action.

Ingestion

Ingestion – If the electrolyte is ingested the electrolyte may cause localized burns.

Inhalation

During normal use inhalation is highly unlikely due to the containment of hazardous materials inside the sealed battery case. However, if the batteries are exposed to extreme heat or pressure causing a breach in the battery case, exposure to the constituents may occur. Inhalation of Cobalt dusts may result in pulmonary conditions.

Skin Absorption

Skin absorption – There is no evidence of adverse effects based on available data.

Skin Contact

Exposure to the electrolyte inside the battery may result in chemical burns. Exposure to nickel may cause dermatitis for some sensitive individuals.

Eye Contact

Exposure to the electrolyte contained inside the battery may result in severe irritation and chemical burns.

Carcinogenicity

Nickel has been identified by the National Toxicology Program (NTP) as reasonably anticipated to be a carcinogen. Cobalt has been identified by IARC as a 2B carcinogen.

Other Effects of Repeated (Chronic) Exposure

Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis in sensitive individuals.

Medical Conditions Aggravated by Overexposure

A knowledge of the toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Classification of Dangerous Substances Contained in Batteries

SUBSTANCES			CLASSIFICATION			
Name	EEC Number CAS Number	Symbol	Letter	Identification of Danger	Special Risk (1)	Safety Advice (2)
Nickel Hydroxide	028-008-x* 12054-48-7	Ni (OH) ₂	Xn	Harmful	R20/22-43-40	S 22/36
Cobalt Hydroxide	- 21041-93-0	Co(OH) ₂	Xn	Harmful	R22-42/43	S 22-24-37
Alkalines Hydroxide	019-022-00-8 1310-58-3	KOH NaOH LiOH	C	Corrosive	R35	S 26-37/39- 45

Nature of Special Risk

R20/22: Harmful by inhalation or if swallowed.
R35: Causes serious burns.
R 40: Possible risk of irreversible effects.
R 43: May cause sensitizing by skin contact.
R 42/43: May cause sensitizing by inhalation and skin contact

Safety Advice

S 22: Do not breathe dust.
S 24: Avoid contact with skin
S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S 36: Wear suitable protective clothing.
S 37: Wear suitable gloves
S 37/39: Wear suitable gloves and eyes/face protection
S 45: In case of accident or if you feel unwell seek medical advice immediately

Section 6 – Emergency First Aid Procedures

Steps to be Taken in Case Material is Released or Spilled

Skin or Eyes

In the event that the battery ruptures, flush exposed skin with copious amounts of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

Swallowing

Ingestion of a battery can be harmful. Call the National Capital Poison Control Center (202-625-3333) (Collect) or your local Poison Control Center (800-222-1222) day or night – for advice and follow up.

Section 7 - Toxicological Information

Nickel Hydroxide: LD50/oral/rat: 1600 mg/Kg
Potassium Hydroxide : LD50/oral/rat: 365mg/Kg
Cobalt Hydroxide: LD50. Not available.

Section 8 – Ecological Information

NiMH cells do not contain cadmium, mercury or lead. The storage battery is TCLP toxic. If not recycled, the battery must be disposed of in accordance with all state and local regulations.

Section 9 – Precautions for Use, Handling and Storage

Storage

Store in a cool place, but prevent condensation on cell or battery terminals. Elevated temperatures may result in reduced battery life. Storage temperatures should be within the range of 40°F (5°C) to 77°F (25°C) in a 65 +/- relative humidity.

Handling

Accidental short circuit will result in high temperature elevation to the battery as well as shorten the battery life. Avoid prolonged short circuit as the heat generated can burn the attendant skin and even rupture the battery cell case. Batteries packaged in bulk containers should not be shaken. Metal covered tables or belts used for the assembly of batteries into devices can result in short circuits; apply insulating materials to assembly work surfaces.

If soldering or welding to the case of the battery is required please consult our Technical Department who will advise of the precautions required.

Charging

NiMH batteries are designed for recharging. A loss of voltage and capacity due to self-discharge in prolonged storage is unavoidable. Charge batteries before use. Always follow the specified charge rate since higher rates can cause a rise in internal gas pressure which may result in damaging heat generation or cell rupture and/or venting.

Labeling

If normal label warnings are not visible, it is important to provide a device label stating:

CAUTION: Do not dispose of in fire. Do not mix with other battery types. Do not charge above the specified rate. Do not connect improperly or short circuit as this may result in overheating, explosion or leakage of cell contents.

Section 10 – Physical Properties

Appearance:

Physical shape and color as supplied.

Temperature Range:

Continuous 40°F (5°C) to 77°F (25°C). Occasional -40°F (-40°C)

Specific Energy:

65 to 75 Wh/Kg. Note Wh = Nominal voltage x rated Ah as defined in IEC standard. Kg. = Average battery rate in kilos.

Specific Instant Power:

About 1500 W/Kg. Note W = 0.5x nominal voltage x 1p. With 1 Ip = current in Amperes delivered by a fully charged battery for half the nominal voltage at one second. Kg. = Average battery rate in kilos.

Mechanical Resistance

As defined in relevant IEC standard.

Continued on page 6

Section 11 – Disposal Considerations

Incineration

Never incinerate NiMH batteries

Landfill

Never dispose of NiMH batteries as landfill.

Recycling

NiMH batteries can be re-cycled.

Additional Information

Dispose of in accordance with all applicable federal, state and local regulations

To find out more about recycling, the applicable Federal and State laws and locate battery recycling locations in your area we would direct you to the following sites:

- <http://www.earth911.org> This is a very comprehensive site, and by entering your zip code the site will direct you to battery recycling depots in your area. Think and act green!
- <http://www.batterycouncil.org> This site will provide you with more information on the recycling process and direct you to the pertinent Federal and State laws.

Section 12 – Transport Information

Power-Sonic sealed Nickel Metal Hydride batteries are considered to be "dry cell" batteries and are unregulated for purposes of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), International Air Transport Association (IATA) and the International Maritime Organization (IMO).

The only requirements for shipping these batteries by DOT is Special Provision 130 which states: "Batteries, dry are not subject to the requirements of this subchapter only when they are offered for transportation in a manner that prevents the dangerous evolution of heat (for example, by the effective insulation of exposed terminals). The only requirements for shipping these batteries by ICAO and IATA is Special Provision A123 which states: "An electrical battery or battery powered device having the potential of dangerous evolutions of heat that is not prepared so as to prevent a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or in the case of equipment, by disconnection of the battery and protection of exposed terminals) is forbidden from transportation."

The International Maritime Dangerous Goods Code (IMDG) regulate them for ocean transportation under Special Provision 304 which says: "Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to the provisions of this Code provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkali-manganese, zinc-carbon, nickel metal hydride and nickel-cadmium batteries.

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