



## MATERIAL SAFETY DATA SHEET

### Sealed Nickel Cadmium Rechargeable Batteries

|                                                                                                                 |                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Manufacturers Name</b><br><br><b>Power-Sonic Corporation,<br/>7550 Panasonic Way<br/>San Diego, CA 92154</b> | <b>Emergency Telephone Numbers:</b><br><b>CHEMTREC (Domestic): (800) 424-9300</b><br><b>CHEMTREC (International): (703) 527-3887</b> |
|                                                                                                                 | <b>Telephone Number for Information</b><br><b>Power-Sonic Corporation: (619) 661-2020</b>                                            |
|                                                                                                                 | <b>Date Issued: January 1, 2007</b>                                                                                                  |

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### Section 1 - Product Identification

|                         |                                                  |
|-------------------------|--------------------------------------------------|
| <b>Product:</b>         | Sealed Nickel Cadmium Rechargeable Batteries     |
| <b>Trade Name:</b>      | Power-Sonic                                      |
| <b>Nominal Voltage:</b> | 1.2V                                             |
| <b>Electrodes:</b>      | Positive: Nickel Oxyhydroxide, Negative: Cadmium |
| <b>Electrolyte:</b>     | Potassium Hydroxide                              |

### Section 2 - Hazardous Ingredients/Identity Information

| Components          | CAS Number | %<br>1 | OSHA PEL<br>( $\mu\text{g}/\text{m}^3$ ) | ACGIH TLV<br>( $\mu\text{m}^3$ ) |
|---------------------|------------|--------|------------------------------------------|----------------------------------|
| Cadmium             | 7440-43-9  | 11-26  | 0.005 TWA <sup>2</sup>                   | 0.05 TWA                         |
| Cadmium Hydroxide   | 21041-95-2 | 11-26  | 0.005 TWA                                | 0.05 TWA                         |
| Nickel Powder       | 7440-02-0  | 8-17   | 1 TWA                                    | 1 TWA                            |
| Nickel Hydroxide    | 12054-48-7 | 5-12   | 1 TWA                                    | 1 TWA                            |
| Potassium Hydroxide | 1310-58-3  | <3     | 2 Ceiling                                | 2 Ceiling                        |
| Nylon               | N/A        | <2     | N/A                                      | N/A                              |
| Steel               | N/A        | 12-13  | N/A                                      | N/A                              |
| Other               | N/A        | <1     | 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 Properties

Each battery cell is a sealed cylindrical container enclosing a cadmium electrode, nickel electrode and KOH or NaOH electrolyte.

|                                     | Cadmium                                    | Cadmium Hydroxide     | Nickel Powder | Nickel Hydroxide   | Potassium Hydroxide                                   |
|-------------------------------------|--------------------------------------------|-----------------------|---------------|--------------------|-------------------------------------------------------|
| Melting Point °F                    | 610                                        | N/A                   | 2,831         | *                  | **                                                    |
| % Volatile by Vol.                  | N/A                                        | N/A                   | N/A           | N/A                | N/A                                                   |
| Evaporation Rate                    | N/A                                        | N/A                   | N/A           | N/A                | N/A                                                   |
| Specific Gravity (H <sub>2</sub> O) | 8.65 @ 77°F                                | 4.79                  | 8.90          | N/A                | N/A                                                   |
| Solubility in Water                 | Insoluble                                  | Practically insoluble | Insoluble     | Insoluble          | Soluble in 0.9 parts water, 0.6 part in boiling water |
| Boiling Point °F                    | 1,407                                      | N/A                   | 5,134         | N/A                | N/A                                                   |
| Vapor Pressure (mm Hg)              | N/A                                        | N/A                   | N/A           | N/A                | N/A                                                   |
| Vapor Density (air=1)               | N/A                                        | N/A                   | N/A           | N/A                | N/A                                                   |
| Appearance and Odor                 | Silver- white, blue tinged, lustrous metal | Powder                | Powder        | Apple green powder | White or slightly yellow                              |

\* Decomposes above 392°F into NiO and water

\*\* Potassium Hydroxide is present as a liquid or paste and acts as the electrolyte in the battery cell.

## 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 |
| Auto Ignition: N/A | Extinguishing Media: Any class of extinguishing media may be used on the batteries |                            |                                 |

**FIRE FIGHTERS SHOULD USE SELF-CONTAINED BREATHING APPARATUS TO AVOID INHALATION OF HAZARDOUS DECOMPOSITION PRODUCTS- SEE SECTION 2.**

Exposure to temperatures above 212 °F can cause evaporation of the liquid content of the potassium hydroxide electrolyte, resulting in the rupturing of the cell. Potential exposure to cadmium fumes during fire; use self-contained breathing apparatus.

## Section 4c – Spill Management Procedure

In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined container. Report all spills in accordance with Federal, State and Local reporting requirements

## Section 5 - Health Hazard Data

### Human Hazards

Threshold Limit Values (TLV) and Source: See Section 2

#### EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE

##### 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 cell case, cadmium fumes and dust may be emitted. Inhalation of cadmium dusts or fumes may cause throat dryness, respiratory irritation, headache, nausea, vomiting, chest pain, extreme restlessness and irritability, pneumonitis and bronchopneumonia. In the case of high concentration exposures (e.g. above 1 to 5mg/m<sup>3</sup> during an eight hour period) death may occur within several days of exposure

##### Ingestion

If the battery case is breached in the digestive tract, the electrolyte may cause localized burns. Ingestion of cadmium compounds may result in increased salivation, choking, nausea, persistent vomiting, diarrhea, abdominal pain, amnesia, tenesmus, and kidney dysfunction.

##### 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

Cadmium and nickel have been identified by the National Toxicology Program (NTP) as reasonably anticipated to be carcinogens. U.S. EPA classified cadmium as a "B1" probable human carcinogen. The International Agency for Research on Cancer (IARC) recommend that cadmium be listed as a "2A" probable human carcinogen and the American Conference of Government Industrial Hygienists (ACGIH) has proposed listing cadmium as an A2 carcinogen.

#### EFFECTS OF REPEAT (CHRONIC) OVEREXPOSURE

##### Repeated (Chronic) Overexposure

Repeated overexposure to cadmium may result in lung cancer; lung, kidney and liver dysfunction, skeletal disease (such as osteoporosis) and reproductive toxicity. Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis of 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.

##### Emergency and First Aid Procedures

Swallowing: Do not induce vomiting. Seek medical attention immediately

Skin: If the internal cell material of an open battery comes into contact with the skin, immediately flush with water for at least 15 minutes.

### **Emergency and First Aid Procedures – continued from previous page**

Inhalation: If potential for exposure to cadmium or nickel fumes or dusts occur, remove immediately to fresh air and seek medical attention.

Eyes: If contents from an open battery come into contact with the eyes, immediately flush with water continuously for at least 15 minutes. Seek medical attention.

### **Stability**

The batteries are stable under normal operating conditions.

Hazardous polymerization will not occur.

Hazardous decomposition products are oxides of cadmium and nickel and potassium hydroxide.

Avoid heat, open flames, sparks and moisture.

Potential incompatibilities: The battery cells are encased in a non reactive container; however, if the container is breached, avoid contact of internal battery components with acids, aldehydes and carbonate compounds.

## **Section 6 – Precautions for Safe Handling and Use**

### **Storage:**

Store in a cool place, but prevent condensation on cells or battery terminals. Elevated temperatures may result in reduced battery life.

### **Mechanical Containment:**

If there are special capsulation or sealing requirements consult our Technical Department about possible cell hazard precautions or limitations.

### **Handling:**

Accidental short circuit will bring high temperature elevation to the battery as well as shorten the battery life. Be sure to avoid prolonged short circuit since the heat generated can burn 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 be the source of short circuits; apply insulating material to assembly work surfaces.

### **Soldering/Welding:**

If soldering or welding to the case is required consult our Technical Department for proper precautions to prevent seal damage or external short circuit.

### **Charging:**

These batteries are designed for recharging. A loss of voltage and capacity of the battery due to self- discharge during prolonged storage is unavoidable. Charge battery before use. Observe 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.

## **Section 7 – Recycling**

All Power-Sonic Nickel Cadmium batteries are classified by the federal government as a hazardous waste and must be recycled. There are numerous depots across the country who will be happy to receive your batteries for recycling.

Please log on to the Earth911 website <http://www.earth911.org> for a list of recycling depots in your area. You may also call Earth 911 at 1-800-CLEANUP or 1-877-EARTH911.

## Section 8 – Transportation

Power-Sonic sealed Nickel Cadmium batteries are considered to be “dry cell” batteries and are unregulated for purposes of transport by the US 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.”

All Nickel Cadmium batteries are classified as a D006 hazardous waste because of the presence of cadmium. This waste code is assigned because of toxicity, not corrosiveness. These batteries do not meet the definition of a corrosive waste.

Power-Sonic Corporation  
7550 Panasonic Way,  
San Diego, CA 92154  
Tel: 619-661-2020  
Fax: 619-661-3650  
E-Mail: [quality-assurance@power-sonic.com](mailto:quality-assurance@power-sonic.com)  
Website: <http://www.power-sonic.com>