1. PRODUCT AND COMPANY IDENTIFICATION
   • Product name: Lithium Ion Battery
   • Product code: Lithium Ion Rechargeable Battery
   • Company name: National Power Corporation
   • Address: 4330 W. Belmont Ave, Chicago, Illinois, 60641, USA
   • Telephone number: 1-773-685-2662
   • Fax number: 1-773-685-8316
   • Emergency telephone numbers: 1-800-424-9300 (North America)
                             001-703-527-3887 (International)

2. COMPOSITION / INFORMATION ON INGREDIENTS
   • Substance or preparation: Preparation
   • Information about the chemical nature of product:

<table>
<thead>
<tr>
<th>Common chemical name / General name</th>
<th>CAS number</th>
<th>Concentration / Concentration range</th>
<th>Classification and hazard labeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Cobaltate (LiCoO₂)</td>
<td>12190-79-3</td>
<td>25-40%</td>
<td>-</td>
</tr>
<tr>
<td>Iron</td>
<td>7439-89-6</td>
<td>15-25%</td>
<td>-</td>
</tr>
<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>2-6%</td>
<td>-</td>
</tr>
<tr>
<td>Graphite (Natural graphite)</td>
<td>7782-42-5</td>
<td>10-20%</td>
<td>Sensitization of the skin group No.2</td>
</tr>
<tr>
<td>(Artificial graphite)</td>
<td>7740-44-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>5-15%</td>
<td>Inflammable liquid</td>
</tr>
<tr>
<td>Organic electrolyte</td>
<td>-</td>
<td>10-20%</td>
<td></td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION
   For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.
   However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.
   Moreover, if heated strongly by surrounding fire, acrid gas may be emitted.
   • Hazards and effects
     Human health effects:
     Inhalation: The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.
     Skin contact: The steam of the electrolyte stimulates skin. The electrolyte skin contact causes a sore and stimulation on the skin.
     Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.
     Environmental effects: Since a battery cell remains in the environment, do not dispose into the environment. • If the electrolyte contacts water, it will generate detrimental hydrogen fluoride.
4. FIRST-AID MEASURES

**Spilled internal cell materials**
- **Inhalation:**
  Make the victim blow his/her nose, gargle. Seek medical attention immediately.
- **Skin contact:**
  Remove contaminated clothes and shoes immediately. Wash extraneous matter or contact region with soap and water immediately.
- **Eye contact:**
  Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

**A battery cell and spilled internal cell materials**
- **Ingestion:**
  Induce vomiting. When it is impossible or the feeling is not well after vomiting, seek medical attention.

5. FIRE-FIGHTING MEASURE

- **Suitable extinguishing media:** Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.
- **Specific hazards:** Corrosive gas may be emitted during fire.
- **Specific methods of fire-fighting:** When the battery burns with other combustibles simultaneously, take fire-extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.
- **Special protective equipment for firefighters:**
  - **Respiratory protection:** Respiratory equipment of a gas cylinder style or protection-against-dust mask.
  - **Hand protection:** Protective gloves.
  - **Eye protection:** Goggle or protective glasses designed to protect against liquid splashes.
  - **Skin and body protection:** Protective wear.

6. ACCIDENTAL RELEASE MEASURES

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the following;
- **Precautions for human body:**
  Remove spilled materials with protective equipment (protective glasses and protective gloves). Avoid inhaling the gas as much as possible. Moreover, avoid skin contact as much as possible.
- **Environmental precautions:** Do not dispose of into the environment.
- **Method of cleaning up:** The spilled solids are placed into a container. Spilled liquids are absorbed with dry cloth.
- **Prevention of secondary hazards:** Avoid re-scattering. Do not bring the collected materials close to fire.

7. HANDLING AND STORAGE

- **Handling**
  - **Technical measures:**
    - Prevention of user exposure: Not necessary under normal use.
    - Prevention of fire and explosion: Not necessary under normal use.
    - Specific safe handling advice: Do not damage or remove the external case.
    - Submerse in water or seawater. Do not expose to strong oxidizers. Do not submit to a strong mechanical shock or crush. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. When charging, use only dedicated charger or charge according to the conditions specified.
  - **Storage**
    - **Technical measures:**
      - Storage conditions: Avoid direct sunlight, high temperature, high humidity.
      - Store in a cool, dry environment (temperature: -20 ~ 35 degree C, humidity: 45 ~ 85%).
      - Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids.
      - Packing material: Electrically insulative and tear-proof materials are recommended.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- **Engineering measures:**
  No engineering measure is necessary during normal use. In the case of internal cell materials' leakage, operate the local exhaust or improve ventilation.

- **Control parameters**

<table>
<thead>
<tr>
<th>Common chemical name / General name</th>
<th>ACGIH (2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TLV-TWA</td>
</tr>
<tr>
<td>Lithium Cobaltate (LiCoO₂)</td>
<td>0.02mg/m³ (as cobalt)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>10mg/m³ (metal coarse particulate)</td>
</tr>
<tr>
<td></td>
<td>5mg/m³ (inflammable powder)</td>
</tr>
<tr>
<td></td>
<td>5mg/m³ (weld fume)</td>
</tr>
<tr>
<td>Carbon (Natural graphite) (Artificial graphite)</td>
<td>2mg/m³ (inhalant coarse particulate)</td>
</tr>
<tr>
<td>Copper</td>
<td>0.2mg/m³ (fume)</td>
</tr>
<tr>
<td></td>
<td>1.0mg/m³ (a coarse particulate, Mist)</td>
</tr>
<tr>
<td>Organic electrolyte</td>
<td>-</td>
</tr>
</tbody>
</table>

ACGIH: American Conference of Governmental Industrial Hygienists, Inc.
TLV-TWA: Threshold Limit Value-Time Weighted Average concentration
BEI: Biological Exposure Indices

- **Personal protective equipment**
  - Respiratory protection: Respirator with air cylinder, dust mask.
  - Hand protection: Protective gloves.
  - Eye protection: Goggle or protective glasses designed to protect against liquid splashes.
  - Skin and body protection: Working clothes with long sleeve and long trousers

9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance**
  - Physical state: Solid
  - Cell Form: Cylindrical
  - Color: Metallic color (without tube)
  - Odor: No odor
- **pH:** NA
- **Specific temperatures/temperature ranges at which changes in physical state occur:**
  - There is no useful information for the product as a mixture.
- **Flash point:** NA
- **Explosion properties:** NA
- **Density:** NA
- **Solubility** , with indication of the solvent(s): Insoluble in water.

10. STABILITY AND REACTIVITY

- **Stability:** Stable under normal use.
- **Hazardous reactions occurring under specific conditions:**
  - Conditions to avoid: When a battery cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.
  - Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.
  - Hazardous decomposition products: Acrid or harmful gas is emitted during fire.
11. TOXICOLOGICAL INFORMATION
There is no available data on the product itself. The information of the internal cell materials is as follows.

**Lithium cobaltate – LiCoO₂**
- **Acute toxicity:** No applicable data.
  - Reference cobalt: LDLo, oral - Guinea pig 20mg/kg
- **Local effects:** Unknown.
- **Sensitization:** The nervous system of respiratory organs may be stimulated sensitively.
- **Chronic toxicity/Long term toxicity:**
  - By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
  - **Skin causticity:** Although it is very rare, the rash of the skin and allergic erythema may result.

**Aluminum**
- **Local effects:** Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
- **Chronic toxicity/Long term toxicity:** By the long-term inhalation of coarse particulate or fume, it is possible to cause a lung damage (aluminum lungs).

**Graphite**
- **Acute toxicity:** Unknown.
- **Local effects:** When it goes into one’s eyes, it stimulates one’s eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.
- **Chronic toxicity/Long term toxicity:**
  - Since the long-term inhalation of high levels of graphite coarse particulate may become a cause of a lung disease or a tracheal disease.
  - **Carcinogenicity:** Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

**Copper**
- **Acute toxicity:**
  - 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.
  - TDLo, hypodermic - Rabbit 375mg/kg
- **Local effects:** Coarse particulate stimulates a nose and a tracheal. When introduced to eyes, the symptom of the reddening and the pain is caused.
- **Sensitization:** Sensitization of the skin may be caused by long-term or repetitive contact.
- **Reproductive effects:** TDLo, oral - Rat 152mg/kg.

**Organic Electrolyte**
- **Acute toxicity:**
  - LD₅₀, oral - Rat 2,000mg/kg or more
- **Local effects:** Unknown.
- **Skin irritation study:** Rabbit - Mild.
- **Eye irritation study:** Rabbit - Severe.

12. ECOLOGICAL INFORMATION
- **Persistence/degradability:** Since a battery and the internal cell materials remain in the environment, do not bury or dispose into the environment.
13. DISPOSAL CONSIDERATIONS

- Recommended methods for safe and environmentally preferred disposal:
  
  **Product (waste from residues)**
  
  Do not dispose a battery into the waste stream. Recycle through an authorized recycling company.

  **Contaminated packaging**
  
  Neither a container nor packing is contaminated during normal use. When internal materials leak from a battery cell contaminates the container, dispose as industrial waste, subject to special control.

14. TRANSPORT INFORMATION

During transportation, avoid exposure to high temperature (above 100 C) and prevent the formation of any condensation. Handle with care, do not drop or crush. Prevent collapse of by excessive cargo weight and wet by rain. The container must be handled carefully. Do not mechanically shock which results in damage. Please also refer to Section 7-HANDLING AND STORAGE.

- UN classification 3480: This product is classified as "Lithium-ion Batteries" (or UN3481 "Lithium-ion Batteries packed with equipment" or "Lithium-ion Batteries contained in equipment"), it is NOT recognized as "DANGEROUS GOODS" when its transport condition accords with "special provision A99 of IATA-DGR" or "special provision 188 of IMO-IMDG Code".

15. REGULATORY INFORMATION

- Regulations specifically applicable to the product:
  
  IATA-DGR (air transportation)
  IMO-IMDG Code (sea transportation)
  US Department of Transportation 49 Code of Federal Regulations [USA]
  Wastes Disposal and Public Cleaning Law [Japan]
  Law for Promotion of Effective Utilization of resources [Japan]

16. OTHER INFORMATION

- The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.
- This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

- Reference
  
  Chemical substances information: Japan Advanced Information center of Safety and Health
  International Chemical Safety Cards (ICSCs): International Occupational Safety and Health Information Centre (CIS)
  2002 TLVs and BEIs: American Conference of Governmental Industrial Hygienists (ACGIH)
  RTECS (CD-ROM)
  MSDS of raw materials prepared by the manufacturers.

First edition: Dec. 01 2003
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