Material Safety Data Sheet
Product name: Nickel–Cadmium Tel.X Battery

1. IDENTIFICATION

Product

Product name
Nickel-Cadmium battery and cell
Trade name
Tel.X Series: 80, 100, 150, 180

Supplier

Saft America Inc.
711 Gil Harbin Industrial Blvd.
Valdosta, GA 31601- USA
Phone: +1 (229)-247-2331
Fax: +1 (229)-245-2890

Saft Bordeaux
111/113 boulevard Alfred Daney
33074 BORDEAUX – France
Phone: +33 (0)5 57 10 64 00
Fax: +33 (0)5 57 10 65 70

For Chemical Emergency
Spill, Leak, Fire, Exposure or Accident
Call CHEMTREC - Day or night
Tel: +1 (800) 424 9300

2. CHEMICAL COMPOSITION

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS #</th>
<th>EINECS#</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (as Cadmium and Cadmium hydroxide)</td>
<td>7440-43-9</td>
<td>231-152-8</td>
<td>19% - 24%</td>
</tr>
<tr>
<td>Nickel (as Nickel and Nickel dihydroxide)</td>
<td>7440-02-0</td>
<td>231-111-4</td>
<td>18% - 23%</td>
</tr>
<tr>
<td>Electrolyte solution (18-30% Potassium hydroxide)</td>
<td>1310-58-3</td>
<td>215-181-3</td>
<td>18% - 23%</td>
</tr>
<tr>
<td>Cobalt (as Cobalt hydroxide)</td>
<td>21041-93-0</td>
<td>244-166-4</td>
<td>2.3% - 2.9%</td>
</tr>
<tr>
<td>Plastics</td>
<td></td>
<td></td>
<td>10% - 12%</td>
</tr>
<tr>
<td>Steel</td>
<td></td>
<td></td>
<td>11% - 15%</td>
</tr>
</tbody>
</table>

3. HEALTH HAZARD IDENTIFICATION

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Chemical</th>
<th>CAS #</th>
<th>EINECS#</th>
<th>Symbol</th>
<th>Risk phrase</th>
<th>Safety phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium hydroxide</td>
<td>Cd(OH)₂</td>
<td>21041-95-2</td>
<td>244-168-5</td>
<td>Xn</td>
<td>R20/21/22</td>
<td>S2, S60, S61</td>
</tr>
<tr>
<td>Nickel dihydroxide</td>
<td>Ni(OH)₂</td>
<td>12054-48-7</td>
<td>235-008-5</td>
<td>Xn,</td>
<td>R40, R20/22</td>
<td>S2, S22, S36, S60; S61</td>
</tr>
<tr>
<td>Potassium hydroxide</td>
<td>K(OH)</td>
<td>1310-58-3</td>
<td>215-181-3</td>
<td>N, Xn</td>
<td>R43, R50/53</td>
<td>S1/2, S36/37/39, S45</td>
</tr>
<tr>
<td>Cobalt hydroxide</td>
<td>Co(OH)₂</td>
<td>21041-93-0</td>
<td>244-166-4</td>
<td>Xn, C, Xn,</td>
<td>R20/21/22, R35, R36/R37/R38, R43</td>
<td>S24, S26, S36/37, S39</td>
</tr>
</tbody>
</table>

*Classification according to the Annex I of Directive 67/548/EEC

Effects of Overexposure

Eye Effects
Contact with electrolyte solution contained inside battery causes very rapid, severe damage. Extremely corrosive to eye tissues. May result in permanent blindness.

Skin Effects
Contact with electrolyte solution inside battery may cause serious burns to skin tissues. Contact with nickel compounds may cause skin sensitization, resulting in chronic eczema or nickel itch.

Ingestion
Ingestion of electrolyte solution causes tissue damage to throat area and gastro/respiratory tract. Ingestion of cadmium and/or nickel compounds causes nausea and intestinal disorders.

Inhalation
Mists generated during activation procedures may cause varying degrees of irritation to the nasal mucous membranes and respiratory tract tissues varying from mild irritation of nasal mucous membranes to damage of lung tissues proper. Inhalation of cadmium compounds may cause dry throat, cough, headache, vomiting, chest pain, and/or chills. Excessive overexposure may result in pulmonary edema, breathing difficulty, and prostration.

Carcinogenicity
NIOSH recommends that nickel and cadmium be treated as occupational carcinogens.
4. FIRST AID MEASURES

**Battery Electrolyte**

<table>
<thead>
<tr>
<th>Eye Contact</th>
<th>Skin Contact</th>
<th>Ingestion</th>
<th>Inhalation</th>
<th>Nickel and Cadmium Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush with plenty of water for at least 20 minutes. Get immediate medical attention.</td>
<td>Remove contaminated clothing and flush affected areas with plenty of water for at least 20 minutes.</td>
<td>Do not induce vomiting. Dilute by giving large volumes of water or milk. Get immediate medical attention. Do not give anything by mouth to an unconscious person.</td>
<td>Remove to fresh air. Give oxygen or artificial respiration if needed. Get immediate medical attention.</td>
<td>Wash with cold water and soap for 15 minutes.</td>
</tr>
</tbody>
</table>

5. FIRE AND EXPLOSION HAZARDS

**Extinguishing Media:**

- CO₂, sand

<table>
<thead>
<tr>
<th>Material</th>
<th>Melting Point</th>
<th>Boiling Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>608°F / 320°C</td>
<td>1410°F / 766°C</td>
</tr>
<tr>
<td>Cadmium hydroxide</td>
<td>N/A</td>
<td>2838°F / 1559°C (sublimes)</td>
</tr>
<tr>
<td>Copper</td>
<td>1981°F / 1083°C</td>
<td>4653°F / 2567°C</td>
</tr>
<tr>
<td>Nickel</td>
<td>2645°F / 1452°C</td>
<td>4950°F / 2732°C</td>
</tr>
<tr>
<td>Nickel dihydroxide</td>
<td>N/A</td>
<td>445°F / 229°C (Decomposes to NiO)</td>
</tr>
</tbody>
</table>

**Cadmium hydroxide**

- **Melting Point:** N/A
- **Boiling Point:** 445°F / 229°C (Decomposes to NiO)

**Case material:**

- **Polamyde 11:**
  - Melting Point: 370-374°F / 188-190°C
  - Boiling Point: N/A (burns may release toxic NO₂, fumes)

**Special Fire Fighting Procedures**

- Use self-contained breathing apparatus to avoid breathing toxic fumes.
- Wear protective clothing and equipment to prevent potential body contact with electrolyte solution or mixture of water and electrolyte solution. **Disconnect or cut all cables to and from battery – especially ground connection.**

**Unusual Fire and Explosion Hazards**

- Electrolyte solution is corrosive to all human tissues. It will react violently with many organic chemicals, especially nitrocarbons and chlorocarbons. Electrolyte solution reacts with zinc, aluminum, tin and other active materials releasing flammable hydrogen gas.

6. ACCIDENTAL RELEASE MEASURES

**Electrolyte Solution Spills**

- **Small (up to 19 liters / 5 gallons):**
  - Flush with water and neutralize with dilute citric acid.
- **Large:**
  - Contain material in suitable containers or holding area. **DO NOT allow material to enter sewers, streams, or storm conduits.** Recover material with vacuum truck and dispose of properly. **Reportable Quantity:** 453.6 kg / 1000 pounds. 40 CFR-117.13.

7. HANDLING AND STORAGE

These cells and the batteries constructed from them may be highly charged and are capable of high energy discharge. Care should be taken to handle cells properly to avoid shorting or misuse that will result in a rapid, uncontrolled electrical, chemical, or heat energy release.

- Do not transport batteries without vent caps in place.
- When removing battery from service, visually inspect for leakage prior to handling. If leakage has occurred follow Spill Management Procedures.
- Store in sealed packaging and in normal vertical position at temperature +20°C (68°F) ± 15°C (± 27°F) and humidity inferior at 47%.
- Keep away from exposed flames, sparks, and other ignition sources.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Exposure control**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS #</th>
<th>EINECS#</th>
<th>Exposures Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (as Cadmium and Cadmium hydroxide)</td>
<td>7440-43-9</td>
<td>231-152-8</td>
<td>5.0 mcg/m³ dust – OSHA</td>
</tr>
<tr>
<td>Cadmium hydroxide</td>
<td>21041-95-2</td>
<td>244-168-5</td>
<td>0.05 mg/m³ ACGIH CEILING-Fume</td>
</tr>
<tr>
<td>Nickel (as Nickel and Nickel dihydroxide)</td>
<td>7440-02-0</td>
<td>231-111-4</td>
<td>1 mg/m³ – OSHA</td>
</tr>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>235-008-5</td>
<td></td>
</tr>
<tr>
<td>Electrolyte solution (18-30% Potassium hydroxide)</td>
<td>1310-58-3</td>
<td>215-181-3</td>
<td>2 mg/m³ ACGIH CEILING-Air</td>
</tr>
<tr>
<td>Cobalt (as Cobalt hydroxide)</td>
<td>21041-93-0</td>
<td>244-166-4</td>
<td>0.1 mg/m³ OSHA</td>
</tr>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>231-159-6</td>
<td>1 mg/ m³ dust – OSHA</td>
</tr>
</tbody>
</table>
8. EXPOSURE CONTROLS AND PERSONAL PROTECTION (continued)

**Personal protection**
Perform battery charging procedures in a well-ventilated area. Battery operating areas must be well ventilated for the removal of potentially dangerous and harmful gases generated. Normal reactions inside the battery liberate explosive and flammable hydrogen gas.

**Respiratory Protection**
Use NIOSH approved mist respirator during activation and actual usage to maintain exposure levels below the TWA.

**Eye Protection**
Use splash goggles or face shield whenever handling a battery.

**Hand Protection**
If exposure to electrolyte solution or dried salts is likely, use any water-insoluble, non-permeable glove, i.e., synthetic rubber. DO NOT use leather or fabric gloves.

**Other protective equipment**
Rubber apron or rainwear, or equivalent if exposure to electrolyte solution is likely.

9. PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>2 mm Hg at 68°F / 20°C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity (electrolyte)</td>
<td>1.17 - 1.30</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Electrolyte solution is completely soluble.</td>
</tr>
<tr>
<td>Rest remains</td>
<td>is insoluble</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

**CAUTION: NEVER ACTIVATE OR TOP OFF WITH ACID**

**Incompatibilities**
Aluminum, zinc, tin and other active metals, acid, chlorinated and aromatic hydrocarbons, nitrocarbons, halocarbons. Trichloroethylene will react with electrolyte solution to form dichloroacetylene which is spontaneously combustible.

**Hazardous Decomposition Products**
Nickel compounds, cadmium compounds, and potassium hydroxide.

Note that normal reactions inside battery liberate explosive and flammable hydrogen gas. Do not seal battery from atmosphere. Hazardous Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>EINECS#</th>
<th>LD₅₀ (Oral, Rat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium hydroxide</td>
<td>21041-95-2</td>
<td>244-168-5</td>
<td>225 mg/kg (Cadmium)</td>
</tr>
<tr>
<td>Nickel hydroxide</td>
<td>12054-48-7</td>
<td>235-008-5</td>
<td>1600 mg/kg</td>
</tr>
<tr>
<td>Potassium hydroxide</td>
<td>1310-58-3</td>
<td>215-181-3</td>
<td>273 mg/kg</td>
</tr>
<tr>
<td>Cobalt hydroxide</td>
<td>21041-93-0</td>
<td>244-166-4</td>
<td>6170 mg/kg (Cobalt)</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

The electrolyte solution (18-30% Potassium Hydroxide) is very toxic to aquatic organisms. It may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Nickel-Cadmium batteries are universal wastes under RCRA. They may be returned to Saft Valdosta or local collecting points mentioned in Saft website (www.saftbatteries.com) for recycling.

These batteries are TCLP Toxic. These batteries and the electrolyte solution they contain are considered to be corrosives. If not recycled, they must be disposed of in accordance with all federal, state, and local hazardous waste regulations.

14. TRANSPORTATION INFORMATION

Batteries being forwarded or being returned to Saft for repair should be shipped as Hazardous Material using the following description:

**Batteries, Wet, Filled with Alkali, 8, UN2795, PG III.**

Spent batteries being sent to Saft Valdosta or local collecting points for recycling should be shipped as Universal Waste using the following description:

**Used Batteries, Wet, Filled with Alkali, 8, UN2795, PG III.**

15. REGULATIONS

**EPCRA reporting requirements**
Section 313 Supplier Notification – This product contains the following EPCRA Section 313 chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372):

<table>
<thead>
<tr>
<th>CAS #</th>
<th>EINECS#</th>
<th>Chemical Name</th>
<th>Percent by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-43-9</td>
<td>231-152-8</td>
<td>Cadmium</td>
<td>22 %</td>
</tr>
<tr>
<td>7440-48-4</td>
<td>231-158-0</td>
<td>Cobalt</td>
<td>2.6 %</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>231-111-4</td>
<td>Nickel</td>
<td>21 %</td>
</tr>
</tbody>
</table>

A copy of this MSDS may be required to be filled with your local emergency planning commission, state emergency response.
Material Safety Data Sheet
Product name: Nickel–Cadmium Tel.X Battery

EPCRA reporting requirements (continued)
commission, and local fire department in accordance with sections of the Emergency Planning and Community right-To-Know Act.

EC classification
Symbols
C Corrosive
N Dangerous for the environment
Xn Harmful
Xi Irritant

Risk phrases
R20 Harmful by inhalation
R21 Harmful in contact with skin
R22 Harmful if swallowed
R36 Irritating to eyes
R37 Irritating to respiratory system
R38 Irritating to skin
R40 Limited evidence of a carcinogenic effect
R41 Risk of serious damage to the eyes
R42 May cause sensitization by skin contact
R50/53 Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases
S1/2 Keep locked up and out of the reach of children
S2 Keep out of the reach of children
S20 When using, do not eat or drink
S22 Do not breathe dust
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36 Wear suitable protective clothing
S37 Wear suitable gloves
S39 Wear eyes/face protection
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible.)
S60 Must be disposed of as hazardous waste.
S61 Avoid release to the environment

16. OTHER INFORMATION

HMIS Ratings
Health 3
Flammability 0
Reactivity 1

NFPA Ratings
Health 3
Flammability 0
Reactivity 1

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