



# Safety Data Sheet

## *Nickel-Cadmium Aircraft Cells and Batteries*

Saft Industrial Nickel-Cadmium batteries are manufactured articles which contain hazardous chemicals. Saft batteries are manufactured to specific shapes and designs and have end use functions that are dependent in whole or in part upon those shapes and designs. Under normal conditions of use, Saft batteries do not release hazardous chemicals and do normally not pose a physical hazard or health risk to the end user.

Under situations involving neglect, misuse, abuse, and/or improper handling and storage, exposure to hazardous chemicals normally contained inside the batteries can result.

### 1. IDENTIFICATION

#### 1.1 Product

Industrial Ni-Cd cells and battery systems composed of these cells

#### 1.2 Supplier

|                                      |  |
|--------------------------------------|--|
| Headquarters<br>Address<br>Phone/Fax | <b>Saft S.A.S.</b><br>26 quai Charles Pasque, 92300 Levallois-Perret – France<br>Tel: +33.1.58.63.16.00/Fax: +33.1.58.63.16.18                           |
| Factory<br>Address<br>Phone/Fax      | <b>Saft Bordeaux</b><br>111-113, boulevard Alfred Daney, 33074 BORDEAUX - France<br>+33 (0)5 57 10 64 00 /+33 (0)5 57 10 68 77                           |
| Factory<br>Address<br>Phone/Fax      | <b>Saft AB</b><br>Jungnergatan – Box 709 SE-572 28 OSKARSHAMN – Sweden<br>+46 491 68 000/ + 46 491 68 180  |
| Factory<br>Address<br>Phone/Fax      | <b>Saft Nersac</b><br>Zone industrielle, 16440 NERSAC - France<br>+33 (0)5 45 90 50 26 /+33 (0)5 45 90 50 71   |
| Factory<br>Address<br>Phone/Fax      | <b>Saft Ferak A.S.</b><br>Raskovice 247, 73904 PRAZMO - Czech Republic<br>+420 558 426 257/+420 558 426 300  |
| Factory<br>Address<br>Phone/Fax      | <b>Saft Valdosta</b><br>711, Industrial Boulevard, VALDOSTA, GA 31601 - USA<br>Tel/Fax : +1 229 247 2331/+1 229 247 8486                                 |
| Factory<br>Address<br>Phone/Fax      | <b>Saft Batteries Co., Ltd.</b><br>Zhuhai Free Trade Zone, Lianfeng Road, ZHUHAI 519030, Guangdong Province – China<br>+86 756 881 9318/+86 756 881 9328 |
| Factory<br>Address<br>Phone/Fax      | <b>Amco Saft India Ltd.</b><br>Hebbal, Bellary – Jakkur Road, Byatarayanapura, BANGALORE 560092 – India<br>+86 756 881 9318/+86 756 881 9328             |

#### 1.3 Emergency contact

**Chemtrec US Service within the USA: +800 424 93 00/outside : +1-202-483-7616 for English speaking**  
**INRS Orfila : +33(0) 1 45 42 59 59 for French speaking**



## 2. HAZARDS IDENTIFICATION

### 2.1 Electrolyte contained in individual cells

**OSHA Hazards:** Electrolyte is Toxic by ingestion; Corrosive

**Electrolyte GHS Classification:**

Acute toxicity, Oral (Category 3)

Skin corrosion (Category 1)

Serious eye damage (Category 1)

Acute aquatic toxicity (Category 3)

**Electrolyte GHS Label elements, including precautionary statements:**

**Pictograms:**



**Signal Word:** Danger

**Electrolyte Hazard statements:**

H301 Toxic if swallowed.

H314 Causes severe skin burns and eye damage.

H402 Harmful to aquatic life.

**Major Health Hazards:** Corrosive. Causes burns to the respiratory tract, skin, eyes, and gastrointestinal tract. CAUSES PERMANENT EYE DAMAGE. Effects of contact or inhalation MAY BE DELAYED.

**Physical Hazards:** Mixing with water, acid or incompatible material may cause splattering and release of heat. Do not store in aluminum or use aluminum fittings or transfer lines as flammable hydrogen may be generated.

**Ecological Hazards:** This material is toxic to aquatic organisms.

### 2.2 At cell level

Not chemically dangerous under normal conditions of use where the electrode materials and the electrolyte are enclosed within the cell. The battery should not be opened or burned. Exposure to or ingestion of the ingredients contained within the cell could be harmful. The following information regarding the hazardous constituents contained within the battery is provided for the user's information:

**EYE CONTACT:** Contact with the electrolyte (potassium hydroxide solution) inside the cells can cause severe eye damage.

**SKIN CONTACT:** Contact with the electrolyte contained inside cells can cause severe burns.

**CARCINOGENIC COMPONENTS:** Cadmium and Nickel compounds

### 2.3 At module and battery system level

**HIGH VOLTAGE:** Always use the large battery systems in a restricted access area. Only authorized people aware of high voltage hazards and trained to work on such systems are allowed to enter in the battery area.

**TEMPERATURE:** Do not place the batteries on or near fires or other high-temperature locations (> 70°C).



### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 At cells and modules level

| Component   | CAS Number | EINECS/ELINCS | Content (wt. %)* |
|---|------------|---------------|------------------|
| Active Nickel (present as Ni and Ni(OH) <sub>2</sub> )  | 12054-48-7 | 235-008-5     | ≈ 36%            |
| Active Cadmium (present as Cd and Cd(OH) <sub>2</sub> ) | 21041-95-2 | 244-168-5     | ≈ 8%             |
| Active Cobalt (present as Co(OH) <sub>2</sub> )         | 21041-93-0 | 244-166-4     | ≈ 1%             |
| Alkaline electrolyte (KOH soln. 18% - 28%)              | 1310-58-3  | 215-181-3     | ≈ 19%            |
| Plastics  | N/A        | N/A           | ≈ 1%             |
| Steel   | N/A        | N/A           | ≈ 24%            |
| Copper  | 7440-50-8  | 231-159-6     | ≈ 4%             |

\* Quantities may vary with cell model

#### 3.2 At battery system level

Depending on the application and on customers' requirements, modules are assembled either in a plastic, wood or steel container.

### 4. FIRST-AID MEASURES (not anticipated under normal conditions of use)

The following measures should be taken in cases involving contact with or exposure to the contents of an opened or leaking cell:

**Eye Contact:** Immediately flush eyes **within seconds of contact** with a stream of water and for at least 15 minutes. Hold eyelids apart for complete irrigation of the eye and eyelid tissues. Get medical attention.

**Skin Contact:** Remove contaminated clothing/jewelry/shoes and immediately flush affected areas with plenty of water or soap and water for at least 15 minutes. Thoroughly clean and dry contaminated clothing prior to reuse. Discard contaminated leather goods. Get medical attention in cases of chemical burns.

**Ingestion:** Do not induce vomiting. Dilute by giving 2 to 4 cups of water. If vomiting occurs, keep airway clear. Give more water when vomiting stops. **Do not give anything by mouth to an unconscious person.** Get medical attention immediately.

**Inhalation:** If adverse effects occur, remove to uncontaminated area with fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be given. If respiration or pulse has stopped, administer Cardio-Pulmonary Resuscitation (CPR) or Automatic External Defibrillator (AED) and call for emergency medical services immediately.

### 5. FIRE-FIGHTING MEASURES (not anticipated under normal conditions of use)

**EXTINGUISHING MEDIA:** Use Class D-Dry chemical and/or sand. Do not use water.

#### **SPECIAL FIRE FIGHTING PROCEDURES:**

Fire fighters should wear self-contained breathing apparatus and full fire-fighting protective clothing.

Cells overheated by an external source or by internal shorting may emit potassium hydroxide mist and/or hydrogen gas.

In fire situations, fumes containing carcinogenic cadmium and nickel compounds may develop which could result in danger of serious acute damage to health by inhalation of fumes.

### 6. ACCIDENTAL RELEASE MEASURES (not anticipated under normal use)

#### **INDIVIDUAL PRECAUTIONS:**

In case of fire, evacuate the area until after fumes have dissipated.

In case of electrolyte leakage, flush electrolyte spillage with plenty of water and beware of risk of slipping/ falling.

In case of skin or eye contact, inhalation or ingestion, follow the measures described in section 12.

**ENVIRONMENTAL PRECAUTION:** Avoid releases of internal components to sewage, surface water and underground water.

**SPILL RESPONSE/CLEANING:** Wear protective goggles or safety glasses with a faceshield and appropriate gloves. Use absorbent clay-based material (oil dry), sand, earth or vermiculite to absorb any exuded or otherwise released electrolyte or internal cell materials. Seal leaking cells/batteries (unless hot) and contaminated absorbent material in plastic bag or suitable leak proof container and send for recycling in accordance with local regulations.



## 7. HANDLING AND STORAGE

**STORAGE:** Store in a dry place. Since accidental short circuiting can cause burn hazard, keep batteries in original packaging until use and do not jumble them.

**HANDLING:**

- Do not short (+) or (-) terminal with conductors/conductive materials.
- Do not reverse the polarity
- Do not open the battery system or modules
- Do not submit to excessive mechanical stress.

**CHARGING/DISCHARGING:** Refer to and follow Saft Instructions.





## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION\* (not necessary under normal use)

| <b>Exposure control</b>                                    |                          |                         |  |
|--|--------------------------|-------------------------|--|
| <b>Ingredients</b>   | <b>CAS #</b>             | <b>EINECS#</b>          | <b>Exposures Limits</b>  |
| Cadmium (as Cadmium and Cadmium hydroxide)                 | 7440-43-9 and 21041-95-2 | 231-152-8 and 244-168-5 | 5.0 mcg/m <sup>3</sup> dust – OSHA; 10 mcg/ m <sup>3</sup> ACGIH<br>OSHA Action Level = 2.5 mcg/m <sup>3</sup> dust<br>0.05 mg/m <sup>3</sup> ACGIH CEILING-Fume |
| Nickel ( as Nickel and Nickel dihydroxide)                 | 7440-02-0 and 12054-48-7 | 231-111-4 and 235-008-5 | 1 mg/m <sup>3</sup> – OSHA<br>1.5 mg/m <sup>3</sup> (inhalable) ACGIH  |
| Electrolyte solution (18-30% Potassium Hydroxide Solution) | 1310-58-3                | 215-181-3               | 2 mg/m <sup>3</sup> OSHA<br>2 mg/m <sup>3</sup> ACGIH CEILING-Air  |
| Cobalt (as Cobalt hydroxide)                               | 21041-93-0               | 244-166-4               | 0.1 mg/m <sup>3</sup> OSHA<br>0.02 mg/m <sup>3</sup> ACGIH   |
| Copper   | 7440-50-8                | 231-159-6               | 1 mg/ m <sup>3</sup> dust – OSHA and ACGIH   |

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

**Handle an opened battery only in a well-ventilated place.**

**Handle an opened battery only in a well-ventilated place.**

|   |                               |   |
|---|-------------------------------|---|
|  | <b>Respiratory protection</b> | Fire fighters should wear self-contained breathing apparatus.   |
|  | <b>Hand protection</b>        | Use polypropylene, polyethylene, rubber or Viton gloves when handling leaking or ruptured cells.  |
|  | <b>Eye protection</b>         | In case of incident or after an abusive use, in case of a leak or cell opening, wear safety glasses with protected side shields or a mask covering the whole face when handling leaking or ruptured cells |
|  | <b>Other</b>                  | In the event of leakage or ruptured cells, wear a rubber apron and protective clothes.  |

\*AFNOR pictograms



## 9. PHYSICAL AND CHEMICAL PROPERTIES

The Nickel-Cadmium cell or battery described by this Safety Data Sheet is a manufactured article and does not expose the user to more than very small quantities or trace amounts of hazardous chemicals when used in accordance with manufacturer specifications.

Physical Appearance: Cell/Battery  
Molecular Weight: Not applicable  
Boiling Point – Not applicable  
Melting Point – Not applicable  
pH: Not applicable

Molecular Formula: Not applicable  
Vapor Pressure – Not applicable  
Vapor Density – Not applicable  
Specific Gravity – Not applicable  
Color: Not applicable

## 10. STABILITY AND REACTIVITY

The battery system is stable when handled and stored according to Section 7.

**MATERIALS TO AVOID:** Do not fill cells with acidic electrolyte (sulfuric acid solution) used for lead-acid batteries.

**CONDITIONS TO AVOID:** Avoid exposing battery to fire or temperature over 85°C. Do not disassemble, crush or short-circuit the electrode connections or install with incorrect polarity. Avoid deformation/crushing of cells

## 11. TOXICOLOGICAL INFORMATION

If the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure, toxic and hazardous internal components may be exposed. Contact with internal cell/battery components can be hazardous and cause injury.

### ACUTE TOXICITY

The electrolyte:

|                     |                          |
|---------------------|--------------------------|
| Potassium hydroxide | LD50/oral/rat: 365 mg/kg |
| Lithium hydroxide   | No data available        |

Cadmium compounds:

|               |   |
|---------------|---|
| Cadmium oxide | LD50/oral/rat: 1,3 mg/m <sup>3</sup> (30 minutes)   |
| Cadmium oxide | LD50/oral/mouse: 0,7 mg/m <sup>3</sup> (30 minutes) |

### HEALTH HAZARD

Skin contact with electrolyte can cause severe injury.

Eye contact with electrolyte rapidly causes severe damage with risk of permanent damage.

Ingestion electrolyte can result in severe injury with risk of permanent damage.

## 12. ECOLOGICAL INFORMATION

There is no ecological harm when batteries are used correctly and returned to Saft for recycling after use has ended.

Spilled/Released electrolyte: If spilled electrolyte reaches surface water bodies, the sharp pH rise may cause harmful impact on fish, plankton and stationary organisms. If released to water bodies, the electrolyte contained in the product can be toxic for aquatic organisms because of alkalinity.

Spills of electrolyte may be characterized as D002 hazardous waste due to characteristic of corrosivity.

## 13. DISPOSAL CONSIDERATIONS

It is recommended that Saft Ni-Cd industrial batteries be returned to Saft for recycling at their end of life. Ni-Cd cells must be collected separately from other waste. Contact your local Saft dealer for recycling information.

**Never incinerate Ni-Cd cells**

**Never dispose of Ni-Cd cells in landfills**

### 13. DISPOSAL CONSIDERATIONS - continued

Europe: End-of-life management must be performed according to directive 2006/66/EC on batteries and accumulators and waste batteries, accumulators and their transposition into each European Union's Member State national legislation. Check with Saft or with your national or local environment authority for details.

Saft has implemented a network of collection and recycling partners for waste industrial Ni-Cd batteries,  
See:

<http://www.saftbatteries.com/TheSaftGroup/Environment/Takebackpolicy/tabid/104/Language/en-US/Default.aspx>  
<http://www.saftbatteries.com/TheSaftGroup/Environment/BringBackPoints/tabid/435/Language/en-US/Default.aspx>

### 14. TRANSPORT INFORMATION

#### 14.1 UNITED NATIONS

- UN N° : 2795

#### 14.2 INTERNATIONAL CONVENTIONS

- Air : IATA
- Sea : IMDG
- Land : ADR (road) or RID (rail) Batteries exempted acc to special paragraph n° 598.

| UN # | NAME<br>Proper shipping name                       | LAND: RAIL & ROAD |      |               |  | SEA (IMDG)   |      |          |  |          | AIR (IATA)   |      |  |          |
|------|--|-------------------|------|---------------|--|--------------|------|----------|--|----------|--------------|------|--|----------|
|      |  | Hazard Class      | Code | Packing group | Labelling  | Hazard Class | Risk | EmS      | Packing group                                      | Labeling | Hazard Class | Risk | Packing group  | Labeling |
| 2795 | BATTERIES WET, FILLED WITH ALKALI Electric storage | 8                 | C 11 | None          | <b>ADR:</b> None if new battery or used, undamaged battery.<br><br><b>DOT and ADR:</b><br><b>Damaged Battery:</b><br>Corrosive | 8            | None | F-A, S-B | None<br><br>(for packaging: no group; and see P801 | 8        | 8            | None | None<br><br>(for packaging: group II; and see A802 and P1870 ) | 8        |

### 15. REGULATORY INFORMATION

#### 15.1 PRODUCT MARKING (EU)



Cd

#### 15.2 PRODUCT MARKING (US)

Regulated marking includes the three pointed chasing arrows symbol (Mobius Loop) with the abbreviation "Ni-Cd" beneath, and the phrase BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY.



Ni-Cd



## 16. OTHER INFORMATION

### NFPA Ratings:

Health 3

Flammability 0

Reactivity 1

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

| <u>CAS #</u> | <u>Chemical Name</u> | <u>Percent by Weight</u> |
|--------------|----------------------|--------------------------|
| 7440-43-9    | Cadmium              | 16%                      |
| 7440-02-0    | Nickel               | 22%                      |
| 7440-48-4    | Cobalt               | 1%                       |

A copy of this MSDS may be required to be filed with your local emergency planning commission, state emergency response commission, and local fire department in accordance with sections of the Emergency Planning and Community right-To-Know Act

### Disclaimer:

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, neither exhaustively nor perfect reliability can be granted. Information does not imply implicit or specific warranty of it.

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