



## SAFETY DATA SHEET SECONDARY NICKEL-CADMIUM SEALED CELLS

Revision C on June 16<sup>th</sup>, 2008: compliance with EEC regulation 1907/2006 (REACH)

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### **1. PRODUCT IDENTIFICATION**

#### **1.1 Product**

Sealed secondary (or rechargeable) Cells

Trade name and model: SAFT, V... according model.

IEC designation: KR... according international standard IEC 61951-1

**Electrochemical system:** Nickel/Cadmium, alkaline electrolyte

Positive electrode: Nickel hydroxide

Negative electrode: Cadmium hydroxide

Electrolyte: Potassium, Sodium and Lithium hydroxide in water solution.

Nominal voltage: 1.2Volts

#### **1.2 Usage**

These sealed secondary (or rechargeable) Cells are being used in batteries for energy supply of electrical systems, in applications such as emergency lighting units or portable systems.

#### **1.3 Supplier**

*Head quarters :*

Name: SAFT

Address: 12 rue Sadi Carnot – 93170 BAGNOLET

Tel/Fax: +33 (0)1 49 93 19 18 / +33 (0)1 49 93 19 50



*Plant:*

Name: SAFT- Nersac

Address: Zone Industrielle – 16440 NERSAC - FRANCE

Tel/Fax: +33 (0)5 45 90 50 26 / +33 (0)5 45 90 57 06

1.4 Contact in case of emergency

Emergency contact: Tel +33 (0)1 49 93 19 18

Internet: [www.saftbatteries.com](http://www.saftbatteries.com) section “contact”

**2. HAZARDS IDENTIFICATION**

**A- Human hazards**

A sealed Nickel-Cadmium cell is not hazardous in normal use.

2.1 Physical

Nickel plated steel cans do not present any risk if cells are used for its intended purpose and according to valid directions for use.

Do not throw in fire or misuse, as a gas containing hydrogen and oxygen can be generated through the safety valve ( explosion risk).

3.2 Chemical

Nickel plated steel cans do not present chemical risk in normal use.

In case of misuse (abusive over charge, reverse charge, external short circuit...) and in case of default, some electrolyte can leak from the cell through the safety vent. In these cases refer to the risk of the Alkaline hydroxides.

The toxic properties of the electrode materials are hazardous only if the materials are released by mechanical damaging the cell or if exposed to fire.

**B- Environnemental hazards**

Metals used in a Ni-Cd cell, and specifically the cadmium, have to be collected and recycled through specialised organisations ( list on [WWW.rechargebatteries.org](http://WWW.rechargebatteries.org)).



### 3. COMPOSITION

Weight percentage of basic materials:

Single cell with steel container

Metals		%	Plastics		%	Other		%
Iron	Fe	25 – 45	Polyamide	PA/PP	2.5 - 5	Potassium	K/Na/Li	1.8 – 4
Nickel	Ni	10 – 25	Rubber	EPDM	< 0.05	Water	H2O	4 – 9
Cadmium	Cd	10 – 19	Polyethylene	PE	0.2 - 0.4	OH-		8 -14
Cobalt	Co	0.4 -2.0	PVC		0.2 - 0.7			

Classification of dangerous substances contained into the cells.

SUBSTANCES			CLASSIFICATION			
Name	N° EC N° CAS N° EINEC	Symbol	Letter	Identification of danger	Special risk (1)	Safety advice (2)
Hydroxyde de cadmium	048-001-00-5 <b>21041-95-2</b> 244-168-5	Cd(OH)2	Xn ; N	Harmful	R 20/21/22 R 50/53	S2, 7/8, 43, 45, 60, 61
Cadmium	048-002-00-0 <b>7440-43-9</b> 231-152-8	Cd	T ; T+ ; N	Carc.cat 2 Muta. Cat 3 Repr. Cat 3	R 45 R68 R62-63 R48/23/25 R17 R26 R50-53	S2, 7/8, 43, 45, 60, 61
Nickel Hydroxyde	028-008-x* <b>12054-48-7</b> 235-008-5	Ni(OH)2	Xn; N	Carc. cat 3 Harmful	R 20/22, 43, 40 R 50/53	S2 S 22 ,36, 60, 61
Cobalt Hydroxyde	- <b>21041-93-0</b> 244-166-4	Co(OH)2	Xn; N	Harmful	R22-43-50/53	S2-24-37; 60,61
Potassium Hydroxyde	019-002-00-8 <b>1310-58-3</b> 215-181-3	KOH	C, Xi	Corrosive , Irritant	R 35, 22 R36-37	S 26-37/39 -45
Sodium Hydroxyde	011-002-00-6 <b>1310-73-2</b> 215-185-5	NaOH	C	Corrosive	R35	S 26-37/39 -45
Lithium Hydroxyde	- <b>1310-65-2</b> 215-183-4	LiOH	C	Corrosive	R 35	S 26-37/39 -45

#### (1) Nature of special risk

- R 17: Spontaneously flammable in air  
 R 20/21/22 : Harmful by inhalation, skin contact or if swallowed.



- R 20/22: Harmful by inhalation or ingestion.
- R 22: Harmful by ingestion.
- R 26: Very toxic by inhalation
- R 35: Causes serious burns.
- R 36/37: Sensitising for eyes and respiratory system.
- R 40: Carcinogenic effect suspected. Possible risk of irreversible effects.
- R 43: May cause sensitising by skin contact.
- R42/43: May cause sensitising by inhalation and skin contact.
- R48/23/25: Toxic: serious health risks in case of prolonged exposition by inhalation or ingestion.
- R50/53: Very toxic for aquatics organisms, possible harmful long term effect on aqueous environment.
- R 62/63: May cause deterioration of fertility and harmful effect for the children during pregnancy
- R 68: Possible irreversible effects.

## (2) Safety advice

- S 2: keep out of reach of children.
- S 7/8: keep the container close
- 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 protection 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.
- S 53: Avoid exposure.
- S 60: Eliminate as a dangerous product.
- S 61: Avoid disposal in the environment. Consult the information about recycling.

## **4. FIRST AID MEASURES**

In case of electrolyte solution spill ( cell leakage) precautions must be taken to avoid any contact of human tissues. If it accidentally happens following must be done:

### 4.1 Inhalation

Fresh air. Rinse mouth and nose with water. Medical treatment.

### 4.2 Skin contact

Rinse immediately with plenty of water. Medical treatment.

### 4.3 Eyes contact



Rinse immediately with plenty of water during at least 15-30 min .Immediate hospital treatment. Consult eye specialist.

#### 4.4 Ingestion

If the injured is fully conscious: plenty of drink, preferably milk. Do not induce vomiting. Immediate Hospital treatment.

### 5. FIRE FIGHTING MEASURES

#### 5.1 Extinguishing media

Suitable: Class D-Dry chemical, sand, CO2.  
Not to be used : Water.

#### 5.2 Special exposure hazards

Cells can be overheated by an external source or by internal shorting and release alkaline electrolyte mist or liquid. In fire situations fumes containing Cadmium may evolve. Electrolyte reacts with zinc, aluminum, tin and other active materials releasing flammable hydrogen gas.  
In case of PVC sleeved products, the combustion releases chloride gas.

#### 5.3 Special protective equipment

Use self-contained breathing apparatus and full fire-fighting protective clothing.

### 6. SPILL MANAGEMENT PROCEDURE

The sealed Ni-Cd cells when sleeved are safe in case of spilling.

Non-sleeved cells may generate short-circuits, causing release of alkaline electrolyte mist or liquid. Electrolyte reacts with zinc, aluminium, tin and other active materials releasing flammable hydrogen gas.

#### 6.1 Individual protections and equipments:

In such a case, use self-contained breathing apparatus and protective clothing.

#### 6.2: Environnemental precautions:

No urgency measure requested.

#### 6.3: cleaning

Collect the cells for recycling, if necessary use sawdust to absorb electrolyte leakages.



## **7. HANDLING USAGE AND STORAGE PRECAUTIONS**

In normal use conditions, no safety rule is specified to handle the cells. Please apply SAFT usage instructions.

It is recommended to store following SAFT specifications in order to ensure longer usage: +5 to +25°C in a 65 +/- 5% relative humidity.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

Under normal condition of use and handling no special protection is required for sealed Ni-Cd cells.

Protection equipments: it is recommended to wear gloves, or to remove rings and metallic objects to avoid short-circuiting the cells.

## **9. PHYSICAL PROPERTIES**

### **9.1 Appearance**

Nickel plated steel cylindrical cell, eventually sleeved. Dimensions and colour according specification.

### **9.2 Temperature range**

Usage recommendd between -40°C and +70°C.  
Risk of electrolyte leakage over 100°C

### **9.3 Specific energy**

30 to 50 Wh/Kg

### **9.4 Specific instant power**

Up to 1000 W/Kg during 1 second

### **9.5 Mechanical resistance**

According mechanical tests in IEC 61951-1 standard.



## 10 STABILITY AND REACTIVITY

### 10.1 Conditions

Ni-Cd cells are stable in storage.

In case of storage in humid atmosphere, some rust may appear on the product.

In case of storage in a charged state, cells progressively loose their energy, generating eventually a progressive temperature increase according the thermal insulation efficiency of the packaging.

In case of exposure to temperature over 100°C, a risk of release of alkaline electrolyte mist or liquid is created. A higher temperature (160°C) the plastics used can melt or decompose (Polyamide gasket, rubber valve, PVC sleeve,...).

In case of mechanical deterioration of the cells, active materials contained as powder can be dispersed (Nickel, Cobalt, cadmium).

### 10.2 Hazardous decomposition products

Electrolyte solution is corrosive to all human tissues and will react violently with many organic chemicals .

Electrolyte solution reacts with zinc, aluminium, tin and other materials releasing flammable hydrogen gas.

## 11 TOXICOLOGICAL INFORMATION

The sealed Ni-Cd cells as a product are not presenting toxicological hazards.

In case of can opening or destruction, the following substances can be released:

SUBSTANCES			HAZARDS		
Name	N° EC N° CAS N° EINEC	Symbol	effects	Dust exposure limits	Carcinogenicity /mutagenicity/re protoxicity
Cadmium	048-002-00-0 <b>7440-43-9</b> 231-152-8	Cd(OH) <sub>2</sub>	LD50. Not available	VME :50 µg/m <sup>3</sup> VLE : 50 µg/m <sup>3</sup> (for CdO)	Carc . cat 2/ Muta Cat. 3/ Repro cat 3
Nickel Hydroxyde	028-008-x* <b>12054-48-7</b> 235-008-5	Ni(OH) <sub>2</sub>	LD50/oral/rat: 1600 mg/Kg	VME : 1000 µg/m <sup>3</sup> VLE : /	Occupational
Cobalt Hydroxyde	- <b>21041-93-0</b> 244-166-4	Co(OH) <sub>2</sub>	LD50/oral/rat: 795 mg/Kg	VME : 100 µg/m <sup>3</sup> VLE : /	/
alkaline Hydroxydes	019-002-00-8 1310-58-3	KOH NaOH LiOH	LD50/oral/rat: 365mg/Kg	KOH VME: 2mg/m <sup>3</sup> NaOH VME:2mg/m <sup>3</sup> LiOH VME : 25µg/m <sup>3</sup>	/



## **12 ECOLOGICAL INFORMATION**

The sealed Ni-Cd cells as a product are not presenting ecotoxicological hazards. In case of product destruction or opening, the substances described in paragraph 11 can come in contact of the environment. The metals content in a Ni-Cd battery, and specifically the cadmium, are toxics for the environment.

If not recycled, it must be disposed of in accordance with all state and local regulations.

## **13 DISPOSAL CONSIDERATIONS**

### **13.1 Incineration**

Never incinerate Ni-Cd batteries.

### **13.2 Landfill**

Never dispose Ni-Cd batteries as landfill.

### **13.3 Recycling**

Nickel Cadmium batteries can be fully recyclable. They are submitted to the European community directive 91-157/CE . Saft recommends proper recycling of these batteries whenever possible.

You may refer to the following web page for further information and guidance :

[www.oecd.org/document/44/0,3343,en\\_2649\\_34371\\_1944748\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/44/0,3343,en_2649_34371_1944748_1_1_1_1,00.html) (1). You can also contact Saft.

*(1) This page provides links to different National Battery Associations and National Collection & Recycling Organisations that can provide you with the latest update on collection & recycling in their respective Countries.*

## **14. TRANSPORT INFORMATION**

Sealed Ni-Cd batteries with sleeve are considered as “dry batteries” which transport is not checked. They are not submitted to specific transport obligations for land , maritime ( IMDG) or air ( IATA) transport, as they are protected against short-circuits.

Sealed Ni-Cd batteries without sleeve are submitted to ADR prescription under UNO code 2800, except in case of qualified packaging use (IATA group 2 type).





## **15. REGULATORY INFORMATIONS**

Nickel Cadmium batteries are submitted to the European community directive 91-157/CE for recycling.

Substances contained are submitted to the REACH 06-1907/CE regulation.

Ni-Cd batteries are classified as hazardous waste in category D006 ( cadmium) according the RCRA act and the Toxic Substance Control act of the US Environment Protection Agency.

EPCRA reporting requirements: this product contains the following EPCRA Section 313 chemicals subject to the reporting requirements of Section 313 in the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372): Nickel, Cadmium and Cobalt according table paragraph 3. in US, 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.

## **16. OTHER INFORMATIONS**

Consult SAFT specifications and precautions of use for optimized use.