



BATTERY INFORMATION SHEET

Sealed Nickel-Cadmium cells, modules and battery systems

Issue C on January 10th, 2017

According to REACH regulation (EC 1907/2006, Art 31) and to OSHA regulation (29 CFR 1910.1200), batteries are ARTICLES with no intended release. As such, they are not covered by legal requirements to generate and supply an SDS or an MSDS. This Battery Information Sheet is provided solely as an information document for the purpose of assisting our customers.

1. PRODUCT IDENTIFICATION

1.1 Product

Sealed Ni-Cd cells and modules or battery systems composed of these cells

1.2 Supplier

Headquarters: ARTS Energy S.A.S.

Address: 10 Rue Ampère – Zone industrielle – 16440 Nersac - France

Phone/Fax: +33 (0)5 45 90 35 50 /+33 (0)5 45 90 37 65

1.3 Emergency contact

Chemtrec US Service within the USA: +800 424 93 00/outside : +1-202-483-7616 for English

INRS Orfila : +33(0) 1 45 42 59 59 for French

2. HAZARD IDENTIFICATION

A- Human hazards

A sealed Nickel-Cadmium cell is not hazardous in normal use when the electrode materials and the electrolyte are content inside the cells. Do not open or burn the products – components or products ingestion could harm the user.

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- Environmental hazards

Metals used in a Ni-Cd cell have to be collected and recycled through specialized organizations (list on www.rechargebatteries.org).

3. COMPOSITION, INFORMATION OR INGREDIENTS

Weight percentage of basic materials:

Single cell with steel container

| Component | CAS Number | EINECS/ELINCS | Content (wt. %)* |
|------------------------------|------------|---------------|------------------|
| Active nickel** | 12054-48-7 | 235-008-5 | 10-25 |
| Active cadmium*** | 21041-95-2 | 244-168-5 | 10-19 |
| Cobalt | 21041-93-0 | 244-166-4 | 0-2 |
| Alkaline electrolyte (pH=14) | N/A | N/A | 14-27 |
| Plastics | N/A | N/A | 3-6 |
| Steel | N/A | N/A | 25-45 |

* Quantities may vary with cell model

** Active nickel present as Ni(OH)₂ and NiOOH

***Active cadmium present as Cd(OH)₂ and Cd

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) |
| Nickel | 028-002-00-7 7440-02-0 231-111-4 | Ni | Xn | Nocif | R 40-43 R 17 | S2, 22, 36 |
| Nickel Hydroxyde | 028-008-x* 12054-48-7 235-008-5 | 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 | - 21041-93-0 244-166-4 | Co(OH)2 | Xn; N | Harmful | R22-43-50/53 | S2-24-37; 60,61 |
| Potassium Hydroxyde | 019-002-00-8 1310-58-3 215-181-3 | KOH | C, Xi | Corrosive , Irritant | R 35, 22 R36-37 | S 26-37/39 -45 |
| Sodium Hydroxyde | 011-002-00-6 1310-73-2 215-185-5 | NaOH | C | Corrosive | R35 | S 26-37/39 -45 |
| Lithium Hydroxyde | - 1310-65-2 215-183-4 | LiOH | C | Corrosive | R 35 | S 26-37/39 -45 |
| Cadmium | 231-152-8 7440-43-9 - | Cd | T+ N | Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 Repr. Cat. 3; R63 T+; R26 T; R48/23/25 N; R50/53 | R45, R68, R62, R63, R26, R48/23/25 R50/53 | S45 S53 S60 S61 |

(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 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.

R50/53: Very toxic for aquatics organisms, possible harmful long term effect on aqueous environment.

(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 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 should be done.

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. 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.

| | | |
|---|-------------------------------|---|
|  | Respiratory protection | Fire fighters should wear self-contained breathing apparatus. |
|  | Hand protection | Use polypropylene, polyethylene, rubber or Viton gloves when handling leaking or ruptured cells. |
|  | Eye protection | 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 |
|  | Other | In the event of leakage or ruptured cells, wear a rubber apron and protective clothes. |

*AFNOR pictograms

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, aluminum, tin and other active materials releasing flammable hydrogen gas.

6.1: Individual protections and equipment

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

6.2: Environmental precautions

No urgency measure requested.

6.3: cleaning

Collect the cells for recycling respecting the local law, 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 ARTS ENERGY usage instructions.

It is recommended to store following ARTS ENERGY 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 equipment: 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 color according specification.

9.2: Temperature range

Usage recommended between -40°C and +70°C.

Risk of electrolyte leakage over 100°C

9.3: Specific energy

30 to 60 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 lose 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. At 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, Zinc, 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, aluminum, 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/ reprotoxicity |
| Nickel | 028-002-00-7 7440-02-0 231-111-4 | Ni | Xn | Nocif | R 40-43 R 17 |
| Nickel Hydroxyde | 028-008-x* 12054-48-7 235-008-5 | Ni(OH) ₂ | LD50/oral/rat: 1600 mg/Kg | VME : 1000 µg/m ³ VLE : / | Occupational |
| Cobalt Hydroxyde | - 21041-93-0 244-166-4 | Co(OH) ₂ | LD50/oral/rat: 795 mg/Kg | VME : 100 µg/m ³ VLE : / | / |
| alkaline Hydroxydes | 019-002-00-8 1310-58-3 | KOH NaOH LiOH | LD50/oral/rat: 365mg/Kg | KOH VME: 2mg/m ³ NaOH VME:2mg/m ³ LiOH VME : 25µg/m ³ | / |
| Cadmium | 231-152-8 7440-43-9 - | Cd | LD50/oral/rat: 225 mg/kg | EU : 4 µg/m ³ for alveolar particles (size < 10 µm) | Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 Repr. Cat. 3; R63 T+; R26 T; R48/23/25 N; R50/53 |

12 ECOLOGICAL INFORMATION

The sealed Ni-CD cells as a product are not presenting Eco toxicological hazards. In case of product destruction or opening, the substances described in paragraph 10 can come in contact of the environment. The metals content in a Ni-CD battery 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.



Cd

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. ARTS Energy 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 (1).

You can also contact ARTS Energy.

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

14. TRANSPORT INFORMATION

Sealed Nickel Cadmium batteries are considered to be "dry cell" batteries and are not subjected to dangerous goods regulation for the purpose of transportation by the U.S. Department of Transportation (DOT), the International Civil Aviation Administration (ICAO), the International Air Transport Association (IATA) or the International Maritime Dangerous Good regulations (IMDG).

International air transport is not restricted provided that, as stated in IATA special provision A164, batteries and battery powered devices/equipment being transported by air are protected from short-circuiting.

Road transport in Europe of new or used cells and batteries with classification UN2800 (Class 8) is not restricted according to ADR special provision 598, providing that requirements of this special provision are met.

More information concerning shipping, testing, marking and packaging can be obtained from your ARTS Energy sales representative.



15. REGULATORY INFORMATION

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.

16. OTHER INFORMATION

Consult ARTS ENERGY specifications and precautions of use for optimized use.

The information has been gathered from sources considered reliable and was the extent of our knowledge, accurate and reliable at the date of issue of this document.

However, they cannot be considered completely comprehensive. This information does not imply an implicit or specific guarantee.

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