ARTS ENERGY

BATTERY INFORMATION SHEET

Sealed Nickel-Metal Hydride cells, modules and battery systems

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1. PRODUCT IDENTIFICATION

1.1 Product

Sealed secondary (or rechargeable) Cells

Trade name and model :	ARTS ENERGY, V… according to the model size and design.
IEC designation :	HR… according to the international standard IEC 61951-2
Electrochemical system :	Nickel/Metal hydride, alkaline electrolyte
Positive electrode :	Nickel hydroxide
Negative electrode :	Metal Hydride
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 backup units or portable systems.

1.3 Supplier

Headquarters :	ARTS Energy S.A.S.
Address :	10 rue Ampère - Zone Industrielle – 16440 NERSAC - FRANCE
Tel/Fax :	+33 (0)5 45 90 35 50 / +33 (0)5 45 90 37 65
US address :	A&A - 9476 Customhouse Plaza, San Diego, CA 92154 USA

1.4 Contact in case of emergency

Emergency contact :	Tel +33 (0)5 45 90 12 19
Internet :	www.arts-energy.com section “contact”

2. HAZARDS IDENTIFICATION

2.1 Human hazards

A sealed Nickel-Metal Hydride 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 arm the user.

2.1.1 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).

2.1.2 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.

2.2 Environmental hazards

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

3. COMPOSITION

Weight percentage of basic materials:
Single cell with steel container

Metals		%	Plastics		%	Other		%
Iron	Fe	15 – 30	Polyamide	PA /PP	2.5 - 3.5	Alcalis	K/Na/Li	1.8 – 3.2
Nickel	Ni	30 – 45	EPDM		< 0.05	Water	H2O	4 - 9
Rare Earth, Mn, Al		7 - 15	Polyethylene	PE	0.2 - 0.4	Hydroxyle	OH-	8 – 14
Cobalt	Co	1 - 5	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)**
Nickel	028-002-00-7 7440-02-0 231-111-4	Ni	Xn	Nocif	H351 H317 H250	P102, P260, P281
Nickel Hydroxide	028-008-x* 12054-48-7 235-008-5	Ni(OH)2	Xn, N	Carc. Cat 3 Harmful	H302/H332, H351, H317 H410	P102, P260, P281, P501
Cobalt Hydroxide	- 21041-93-0 244-166-4	Co(OH)2	Xn, N	Harmful	H302, H351, H410	P501
Potassium hydroxide	019-002-00-8 1310-58-3 215-181-3	KOH	C, Xi	Corrosive, Irritant	H314, H302 H319, H335	P305, P280, P309
Sodium Hydroxide	011-002-00-6 1310-73-2 215-185-5	NaOH	C	Corrosive	H314	P305, P280, P309
Lithium Hydroxide	- 1310-65-2 215-183-4	LiOH	C	Corrosive	H314	P305, P280, P309

(1) Nature of special risk
H250: Spontaneously flammable in air
H312: Harmful by skin contact.
H302: Harmful by ingestion
H332: Harmful by inhalation.
H314: Causes serious burns.
H319: Sensitizing for eyes.
H335: Sensitizing for respiratory system.
H351: Carcinogenic effect suspected. Possible risk of irreversible effects.
H317: May cause sensitizing by skin contact.
H410: Very toxic for aquatics organisms, possible harmful long-term effect on aqueous environment.

(2) Safety advice
P102: Keep out of reach of children.
P404: Keep the container close
S 260: Do not breathe dust.
S 24: Avoid contact with skin
P305: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36: Wear suitable protection clothing.
P280: Wear suitable gloves.
P280: Wear suitable gloves and eyes/face protection.
P309: In case of accident or if you feel unwell, seek medical advice immediately.
P501: Eliminate as a dangerous product.

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-MH 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-MH 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

33 to 80 Wh/Kg

9.4 Specific instant power

Up to 1000 W/Kg during 1 second

9.5 Mechanical resistance

According mechanical tests in IEC 61951-2 standard.

10. STABILITY AND REACTIVITY

10.1 Conditions

Ni-MH 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, Metal hydride).

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-MH 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**	**Identification of danger**	**Carcinogenicity Mutagenicity Reprotoxicity**
Nickel	028-002-00-7 7440-02-0 231-111-4	Ni	Xn	Nocif	H351 H317 H250
Nickel Hydroxide	028-008-x* 12054-48-7 235-008-5	Ni(OH)2	LD50/oral/rat: 1600 mg/kg	VME: 1000µg/m3 VLE: /	Occupationnal
Cobalt Hydroxide	- 21041-93-0 244-166-4	Co(OH)2	LD50/oral/rat: 795 mg/kg	VME: 100µg/m3 VLE: /	/
alkaline hydroxide	019-002-00-8 1310-58-3	KOH NaOH LiOH	LD50/oral/rat: 365 mg/kg	KOH VME: 2µg/m3 NaOH VME: 2µg/m3 LiOH VME: 25µg/m3	/

12 ECOLOGICAL INFORMATION

The sealed Ni-MH 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-MH 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-MH batteries.

13.2 Landfill

Never dispose Ni-MH batteries as landfill.

13.3 Recycling

Nickel Metal hydride 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 Ni-MH batteries with sleeve are considered as “dry batteries” are not defined as dangerous goods under the IATA Dangerous Goods Regulations, ICAO Technical Instructions and the US hazardous materials regulations (49 CFR). Nickel metal hydride batteries are defined as dangerous goods under the IMDG code.

NiMH cells or batteries shall be securely packed and protected from short circuit. They are not subject to other provisions of this code if they are loaded in a cargo transport unit in a total quantity of less than 100 kg gross mass.

For air and ground transportation, these batteries are not subject to the dangerous goods regulations as they are compliant with the requirements contained in the following special provisions.

Regulatory Body	Special Provisions
ADR	Not Regulated
IMDG	UN3496 SP 963 (>100kg)
UN	Not Regulated
US DOT	49 CFR 172.102 Provision 130
IATA	UN 3496 SP A123 and A199 (>100kg)
ICAO	Not Regulated

15. REGULATORY INFORMATION

Nickel Metal hydride 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 were 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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