BATTERY NICKEL-METAL HYDRIDE INFORMATION SHEET

MATERIAL SAFETY DATA SHEET

ARTS-Energy Part

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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

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
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.
Supplier	ARTS Energy 10 rue Ampère - Zone Industrielle 16440 Nersac FRANCE Tel. No. +33 (0)5 45 90 35 50 Fax No. +33 (0)5 45 90 37 65
Emergency contacts	Tel +33 (0)5 45 90 12 19. Internet : www.arts-energy.com section "contact

2. Hazards identification

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.

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).

Chimical

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.

ENVIRONNEMENTAL HAZARDS :

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

3. Composition & Information on components

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 – H20	4 - 9
Rare Earth – Mn / Al	7 - 15	Polyethylene – PE	0,2 - 0,4	Hydroxyde – 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	Hazard identification	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.
H302 : Harmful if swallowed.
H312 : Dangerous in case of skin contact.
H314 : Causes severe burns.
H317 : May cause sensitization by skin contact.
H319 : Sensitization to eyes.
H332: Harmful if inhaled.
H335 : Sensitization of the respiratory system.
H351 : Suspected carcinogenic effect. Possible risk of irreversible effects.

H410: Very toxic to aquatic organisms, possible long-term adverse effect on the aqueous environment.

(2) Security advise
P102: Keep out of reach of children.
P280 : Wear suitable gloves and eye/face protection.
P305 : In case of contact with eyes, rinse immediately with plenty of water and seek medical attention.
P309: In case of accident or if you feel unwell, seek medical attention immediately.

P501: Dispose of as hazardous material.
S 24: Avoid contact with skin.
S 36: Wear suitable protective clothing.
S 260: Do not breathe dust.

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:

Inhalation	Fresh air. Rinse mouth and nose with water. Medical treatment
Contact avec la peau	Rinse immediately with plenty of water. Medical treatment.
Contact avec les yeux	Rinse immediately with plenty of water during at least 15-30 min. Immediate hospital treatment. Consult eye specialist.
Ingestion	If the injured is fully conscious: plenty of drink, preferably milk. Do not induce vomiting. Immediate Hospital treatment should be done.

5. Firefighting measures

Extinguishing media
Suitable: Class D-Dry chemical, sand, CO_2.
Not to be used: Water.

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.

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

	**Respiratory protection**	Fire fighters should wear self-contained 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 if leakage or ruptured cells, wear a rubber apron and protective clothes.

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.

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

Environnemental precautions
No urgency measure requested.

Cleaning
Collect the cells for recycling respecting the local law, if necessary, use sawdust to absorb electrolyte leakages.

7. Handling and storage

Manipulation	***Do not allow children to replace batteries without adult supervision.*** In normal use conditions, no safety rule is specified to handle the cells. Please apply ARTS ENERGY usage instructions.
Stockage	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 and Chemical properties

Apparence	Nickel plated steel cylindrical cell eventually sleeved. Dimensions and color according to specification.
Temperature range	Usage recommended between -40°C and +70°C. Risk of electrolyte leakage over 100°C
Specific energy	33 to 80 Wh/Kg
Specific instant power	Up to 1000 W/Kg during 1 second
Mecanical resistance	According to mechanical tests in IEC 61951-2 standard.

10. Stability and reactivity

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 to 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).
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

Substances			Hazards		
Name	**N° EC N° CAS N° EINEC**	**Symbol**	**Effets**	**Hazards identification**	**Cancerogenicity 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. Information éco toxicologique

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

Incineration
Never incinerate Ni-MH batteries.

Landfill
Never dispose Ni-MH batteries as landfill.

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 can also contact ARTS Energy.

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 (64rd edition IATA DGR 2023), 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.

Regulation 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-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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