Material Safety Data Sheet
MSDS 2.001.017

Rechargeable Ni-MH Cylindrical

1. Identification of the product and of the company undertaking

Product details

Trade name:	Rechargeable Ni-MH cylindrical
Product types	VH 700 AAA, VH 1300 AA, VH 1600 AA, VH 1800 AA VH 2050 4/5A, VH 2100 4/5A, VH 2650 A, VH 2700 A, VH 3750 4/3A, VH 4000 4/3A, VH 4400 4/3FA, VH 4500 4/3FA, (or multi-cell assemblies of these basis cells, number x of cells indicated by x/...)
Voltage:	1.2 V (or multiples of 1.2 V in case of assembled batteries)
Electrochemical system:	Nickel metal hydride
Anode (negative electrode):	Metal hydride
Cathode (positive electrode):	Nickel hydroxide

Supplier details

Address:	VARTA Microbattery GmbH Daimlerstr. 1 D-73479 Ellwangen/Jagst Germany
Emergency telephone number:	+49-7961-921-211

Legal Remark (U.S.A.)

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempted from the requirements of the Hazard Communication Standard.

Legal remark (EU)

These batteries are no “substances” or “preparations” according to Regulation (EC) No 1907/2006 EC. Instead they have to be regarded as “articles”, no substances are intended to be released during handling. Therefore there is no obligation to supply a MSDS according to Regulation (EC) 1907/2006, Article 31.

General remark

This “Safety Information” is provided as a service to our customers. The details presented are in accordance with our present knowledge and experiences. They are no contractual assurances of product attributes.

2. Hazards identification

A sealed Nickel-Metal hydride cell/battery is not hazardous in normal use.

In case of mistreatment (abusive over charge, reverse charge, external short circuit…) and in case of fault, some electrolyte can leak from the cell through the safety device. In these cases refer to the risks of potassium hydroxide solution or sodium hydroxide solution (corrosive, pH > 14). The electrode materials are only hazardous, if the materials are released by mechanical damaging of the cell or if exposed to fire.

3. Composition/information on ingredients

Ingredients

Contents	CAS No.	Hazard Symbols	R Phrases	Material
< 35 %		F, Xn	11 - 17 - 40 - 42/43	Mischmetal nickel alloy
< 30 %	12054-48-7	Xn, N	20/22 - 40 - 43 - 50/53	Nickel hydroxide
< 20 %	1310-58-3	C	22 - 35	Potassium hydroxide
< 20 %	1310-73-2	C	35	Sodium hydroxide
< 3 %		Xn, N	22 - 42/43 - 50/53	Cobalt and compounds

Heavy Metals

Contents	CAS No.	Material
< 20 mg/kg	7440-43-9	Cadmium
< 40 mg/kg	7439-92-1	Lead
< 5 mg/kg	7439-97-6	Mercury
< 5 mg/kg		Hexavalent Chromium (Cr^{6+})

Other Ingredients

Contents	CAS No.	Material
10 - 60 %		Steel and nickel
2 - 10 %		Polymers

During charge process, the mischmetal nickel alloy is loaded with hydrogen, this compound is flammable (F).

Hazard Symbols	Xn	Harmful
	F	Highly flammable
	C	Corrosive
	N	Dangerous for the environment

R Phrases	11	Highly flammable.
	17	Spontaneously flammable in air.
	20/22	Harmful by inhalation and if swallowed.
	22	Harmful if swallowed.
	35	Causes severe burns.
	40	Limited evidence of a carcinogenic effect.
	42/43	May cause sensitization by inhalation and skin contact.
	43	May cause sensitization by skin contact.
	50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4. First aid measures

Measures at accidental release

After inhalation:	Fresh air. Seek for medical assistance.
After skin contact:	Flush affected areas with plenty of water. Remove contaminated cloth immediately. Seek for medical assistance.
After eye contact:	Flush the eye gently with plenty of water (at least 15 minutes). Seek for medical assistance.
After ingestion:	Drink plenty of water. Avoid vomiting. Seek for medical assistance. No trials for neutralization.

5. Fire fighting measures

Suitable extinguishing media:	Use foam, dry powder or carbon dioxide (CO_2), as appropriate.
Extinguishing media with limited suitability:	Water is only applicable for incipient fire.
Special protection equipment during fire-fighting:	Contamination cloth including breathing apparatus.
Special hazard:	Under fire conditions, the electrode materials can form carcinogenic nickel and cobalt oxides.

6. Accidental release measures

Person related measures:	Wear personal protective equipment adapted to the situation (protection gloves, cloth).
Environment protection measures:	In the event of battery rupture, prevent skin contact and collect all released material in a plastic lined container. Dispose off according to the local law and rules. Avoid leached substances to get into the earth, canalization or waters.
Treatment for cleaning:	If battery casing is dismantled, small amounts of electrolyte may leak. Pack the battery including ingredients as described above. Then clean with water.

7. Handling and storage

Guideline for safe handling:	Always follow the warning information on the batteries and in the manuals of devices. Only use the recommended battery types. Keep batteries away from children. For devices to be used by children, the battery casing should be protected against unauthorized access. Unpacked batteries shall not lie about in bulk. In case of battery change always replace all batteries by new ones of identical type and brand. Do not swallow batteries. Do not throw batteries into water. Do not throw batteries into fire. Avoid deep discharge. Do not short-circuit batteries Use recommended charging time and current.
Storage:	Storage preferably at room temperature 20 °C. Keep batteries between -20 °C and 35 °C for prolonged storage. When the are close to fully charged, the storage temperature should be between -20 °C and 30 °C. Do not store close to the heating. Avoid direct sunlight.

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany

Storage of large amounts:	If possible, store the batteries in original packaging (short circuit protection); A fire alarm is recommended; For automatic fire extinction consider chapter 5 “Fire fighting measures”.
VCI storage category:	It is recommended to consider the “VCI Guideline for the mixed storage of chemicals” and to handle nickel metal hydride cylindrical cells/batteries according to storage category 11 (“combustible solids“).

8. Exposure controls/personal protection

Under normal conditions (during charge and discharge) release of ingredients does not occur.

9. Physical and chemical properties

Not applicable if closed.

10. Stability and reactivity

Dangerous reactions:	When heated above 150°C the risk of rupture occurs.

11. Toxicological information

Under normal conditions (during charge and discharge) release of ingredients does not occur. If accidental release occurs see information in section 2, 3, and 4.

Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up.

12. Ecological information

Nickel metal hydride cylindrical cells/batteries do not contain heavy metals as defined by the European directive 2006/66/EC Article 21.

13. Disposal considerations

USA: Nickel metal hydride cylindrical cells/batteries are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials and are accepted for recycling by the Rechargeable Battery Recycling Corporation's (RPBC) Battery Recycling Program. Please go to the RPRC website at www.rbrc.org for additional information.

In the European Union, manufacturing, handling and disposal of batteries is regulated on the basis of the DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC. Customers find detailed information on disposal in their specific countries using the web site of the European Portable Batteries Association (http://www.epbaeurope.net/legislation_national.html).

Importers and users outside EU should consider the local law and rules.

In order to avoid short circuit and heating, used nickel metal hydride cylindrical cells/batteries should never be stored or transported in bulk. Proper measures against short circuit are:

- Storage of batteries in original packaging
- Coverage of the terminals

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany

14. Transport information

VARTA nickel metal hydride cylindrical cells/batteries are considered to be “dry cell” batteries and are unregulated for purposes of transportation by the U.S. Department of Transportation (DOT), International Civic Aviation Administration (ICAO), International Air Transport Association (IATA), the International Maritime Organization (IMO) and the Accord Europeén Relatif au Transport International des Marchandises Dangereuses par Route (ADR).

EU: Special Provision 304 (ADR): *“Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to the requirements of RID/ADR provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries.”*

USA: 49 CFR § 172.102 Special Provision 130: *“For other than a dry battery specifically covered by another entry in the § 172.101 Table, “Batteries, dry” are not subject to the requirements of this subchapter when they are securely packaged and offered for transportation in a manner that prevents the dangerous evolution of heat (for example, by the effective insulation of exposed terminals) and protects against short circuits.”*

15. Regulatory information

Marking consideration:	Nickel metal hydride cylindrical cells/batteries, which contain electronic modules and which are subjected to the EMC directive 93/97/EEC, must be CE approved and must wear the CE marking. According to DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC all batteries have to be marked with the crossed bin.
Water hazard class:	(according to German Federal Water Management Act) non-water pollution according to VwVwS Appendix 1 (No. 1443 and 766)

16. Other information

Note:	Date of issue of the transport regulations: ADR 2009, IATA 2008, IMDG 2006, DOT / 49 CFR 2008.
Issued by:	VARTA Microbattery GmbH Quality/Environmental Management
Contact person:	Dr. Rainer Jostes Tel. +49-7961-921-680 Fax +49-7961-921-73680 E-Mail: rainer.jostes@varta-microbattery.com

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany