
Rechargeable NiMH cylindrical cell

1 Identification of the product and of the company undertaking

Product details

Trade name	VARTA rechargeable nickel metal hydride cylindrical cells and batteries
Voltage	1.2 V (or an integer multiple thereof in case of assembled batteries)
Electrochemical system:	Nickel metal hydride
Anode (negative electrode):	Metal hydride
Cathode (positive electrode):	Nickel hydroxide

This MSDS applies to the following cell types and multi-cell assemblies of these basis cells, where the number x of cells is indicated by x/...

D 1247 06, VH 700 AAA, VH 1300 AA, VH 1600 AA, VH 1650 AA, VH 1800 AA, VH 2000 AA, VH 2100 4/5A, VH 2200 AA, VH 2700 A, VH 3800 4/3A, VH 4000 4/3A, VH 4500 4/3FA, VH 6000 D.

Supplier details

Address:	VARTA Microbattery GmbH VARTA-Platz 1 73479 Ellwangen Germany
Emergency Phone Number:	+49 7961 921 110 (VAC)

General remark

This 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.

Legal remark (EU)

These batteries are no "substances" or "mixtures" 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 safety data sheet according to Regulation (EC) 1907/2006, Article 31.

Legal remark (USA)

Safety Data Sheets 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". According to OSHA, Article means 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 (as determined under paragraph (d) of this section), 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.

2 Hazards identification

Sealed VARTA rechargeable nickel metal hydride cylindrical cells and batteries are not hazardous in normal use (as defined in section 7).

In case of mistreatment (abusive overcharge, prolonged deep discharge, reverse charge, external short circuit, drop ...) and in case of fault, some electrolyte can leak from the cell. In these cases refer to the risk of potassium 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.

In case of mistreatment (abusive overcharge, external short circuit, drop ...) and in case of fault cells may generate heat.

3 Composition/information on ingredients

Ingredients

Content	CAS no.	EC no.	Material	Hazard Categories	Hazard Statements
< 35 %	confidential	confidential	Mischmetal nickel alloy	Flam. Sol. 2, Pyr. Sol. 1, Resp. Sens. 1, Skin Sens. 1, Carc. 2, STOT RE 1, Aquatic Chronic 3	H228, H250, H334, H317, H351, H372, H412
< 35 %	12054-48-7	235-008-5	Nickel hydroxide	Acute Tox. 4, Skin Irrit. 2, Skin Sens. 1, Acute Tox. 4, Resp. Sens. 1, Muta. 2, STOT RE 1, Aquatic Acute 1, Aquatic Chronic 1, Carc. 1A, Repr. 1B	H302, H315, H317, H332, H334, H341, H372, H400, H410, H350i, H360D
< 20 %	1310-58-3	215-181-3	Potassium hydroxide	Acute Tox. 4, Skin Corr. 1A	H302, H314
< 20 %	1310-73-2	215-185-5	Sodium hydroxide	Acute Tox. 4, Skin Corr. 1A	H302, H314
< 8 %	7440-48-4	231-158-0	Cobalt and compounds	Acute Tox. 4, Skin Sens. 1, Aquatic Acute 1, Aquatic Chronic 1	H302, H317, H400, H410
10 – 60 %	various	various	Steel and nickel		
2 – 10 %	confidential	confidential	Polymers		

For full text of hazard statements see section 16.

During charge process, the mischmetal nickel alloy is loaded with hydrogen. This compound is flammable.

Substances relevant for Battery Directive 2006/66/EC

Content	CAS no.	EC no.	Material
< 40 mg/kg	7439-92-1	231-100-4	Lead (none intentionally introduced)
< 1 mg/kg	7439-97-6	231-106-7	Mercury (none intentionally introduced, see section 12)
< 10 mg/kg	7440-43-9	231-152-8	Cadmium (none intentionally introduced)

4 First-aid measures

After inhalation:	Fresh air. Seek for medical assistance.
After skin contact:	Remove solid particles immediately. Flush affected areas with plenty of water (at least 15 min). Remove contaminated cloth immediately. Seek for medical assistance.
After eye contact:	Flush the eye gently with plenty of water (at least 15 min). Seek for medical assistance.
After ingestion of battery components:	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 dry sand, as appropriate
Extinguishing media with limited suitability:	Water and carbon dioxide (CO ₂) are 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.
Attention:	Do not let used extinguishing media penetrate into surface water or ground water. If necessary, thicken water or foam with suitable solids. Dispose of properly.

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. Do not open or disassemble batteries.
Storage:	Storage preferably at room temperature (approx. 20 °C). Avoid large temperature changes. Do not store close to heating devices. Avoid direct sunlight. At higher temperature the electrical performance may be reduced. Storage of unpacked batteries can cause short circuit and heat generation.
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 section 5.
Storage category according to TRGS 510:	It is recommended to consider the "Technical Rule for Hazardous Substances TRGS 510 - Storage of hazardous substances in nonstationary containers" and to handle VARTA rechargeable nickel metal hydride cylindrical cells and 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. Due to special safety construction, rupture implies controlled release of pressure without ignition.
----------------------	--

11 Toxicological information

Under normal conditions (during charge and discharge) release of ingredients does not occur. In case of accidental release see information in sections 2 to 4 and 6.

Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up. See section 4.

12 Ecological information

VARTA rechargeable nickel metal hydride cylindrical cells and batteries do not contain heavy metals as defined by the European directives 2006/66/EC Article 21; they comply with the chemical composition requirements of this Directive.

Mercury has not been "*intentionally introduced (as distinguished from mercury that may be incidentally present in other materials)*" in the sense of the U.S.A. "*Mercury-Containing and Rechargeable Battery Management Act*" (May 13 1996).

The Regulation on Mercury Content Limitation for Batteries promulgated on 1997-12-31 by the China authorities including the State Administration of Light Industry and the State Environmental Protection Administration defines "*low mercury*" as "*mercury content by weight in battery as less than 0.025%*", and "*mercury free*" as "*mercury content by weight in battery as less than 0.0001%*". And therefore: VARTA rechargeable nickel metal hydride cylindrical cells and batteries belong to the category of mercury-free battery (mercury content lower than 0.0001 %).

13 Disposal considerations

In order to avoid short circuit and heating, used VARTA rechargeable nickel metal hydride cylindrical cells and 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
- Embedding in dry sand

European Union

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 (www.epbaeurope.net/legislation_national.html).

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

USA

VARTA rechargeable nickel metal hydride cylindrical cells and 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 Call2Recycle, Inc. Please go to their website at www.call2recycle.org for additional information.

14 Transport information

General considerations

VARTA rechargeable nickel metal hydride cylindrical cells and 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), the Accord Européen Relatif au Transport International des Marchandises Dangereuses par Route (ADR) and the Règlement concernant le transport international ferroviaire de marchandises Dangereuses (RID).3

Code of practice for packaging and shipment of secondary batteries given in IEC 62133-1:2017: "*The goal of packaging of secondary cells and batteries for transport is to prevent opportunities for short circuit, mechanical damage and possible ingress of moisture. The materials and packaging design should be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.*"

IATA DGR

Special Provision A199: "The UN number UN 3496 is only applicable in sea transport. Nickel-metal hydride batteries or nickel-metal hydride battery-powered devices, equipment or vehicles having the potential of a dangerous evolution of heat are not subject to these Regulations provided they are prepared for transport so as to prevent: (a) a short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and (b) unintentional activation. The words "Not Restricted" and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued."

ADR/RID

Chapter 3.2 Table A: "Batteries, nickel-metal hydride, UN 3496, not subject to ADR."

IMDG Code

Regulated as "Batteries, nickel-metal hydride, UN 3496".

Special Provision 963: "...nickel-metal hydride cells or batteries shall be securely packed and protected from short circuit. They are not subject to other provisions of this Code provided that they are loaded in a cargo transport unit in a total quantity of less than 100 kg gross mass. When loaded in a cargo transport unit in a total quantity of 100 kg gross mass or more, they are not subject to other provisions of this Code except those of 5.4.1, 5.4.3 and column (16) of the dangerous goods list in Chapter 3.2."

USA

49 CFR § 172.102

Special Provision 130: "Batteries, dry, sealed, n.o.s., commonly referred to as dry batteries, are hermetically sealed and generally utilize metals (other than lead) and/or carbon as electrodes. These batteries are typically used for portable power applications. The rechargeable (and some non-rechargeable) types have gelled alkaline electrolytes (rather than acidic) making it difficult for them to generate hydrogen or oxygen when overcharged and therefore, differentiating them from non-spillable batteries. Dry batteries specifically covered by another entry in the § 172.101 Table must be transported in accordance with the requirements applicable to that entry. For example, nickel-metal hydride batteries transported by vessel in certain quantities are covered by another entry (see Batteries, nickel-metal hydride, UN3496). Dry batteries not specifically covered by another entry in the § 172.101 Table are covered by this entry (i.e., Batteries, dry, sealed, n.o.s.) and are not subject to requirements of this subchapter except for the following: (a) Incident reporting. For transportation by aircraft, a telephone report in accordance with § 171.15(a) is required if a fire, violent rupture, explosion or dangerous evolution of heat (i.e., an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a dry battery. For all modes of transportation, a written report submitted, retained, and updated in accordance with § 171.16 is required if a fire, violent rupture, explosion or dangerous evolution of heat occurs as a direct result of a dry battery or battery-powered device. (b) Preparation for transport. Batteries and battery-powered device(s) containing batteries must be prepared and packaged for transport in a manner to prevent: (1) A dangerous evolution of heat; (2) Short circuits, including but not limited to the following methods: (i) Packaging each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material; (ii) Separating or packaging batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g., metal) in the packagings; or (iii) Ensuring exposed terminals or connectors are protected with non-conductive caps, non-conductive tape, or by other appropriate means; and (3) Damage to terminals. If not impact resistant, the outer packaging should not be used as the sole means of protecting the battery terminals from damage or short circuiting. Batteries must be securely cushioned and packed to prevent shifting which could loosen terminal caps or reorient the terminals to produce short circuits. Batteries contained in devices must be securely installed. Terminal protection methods include but are not limited to the following: (i) Securely attaching covers of sufficient strength to protect the terminals; (ii) Packaging the battery in a rigid plastic packaging; or (iii) Constructing the battery with terminals that are recessed or otherwise protected so that the terminals will not be subjected to damage if the package is dropped. (c) Additional air transport requirements. For a battery whose voltage (electrical potential) exceeds 9 volts - (1) When contained in a device, the device must be packaged in a manner that prevents unintentional activation or must have an independent means of preventing unintentional activation (e.g., packaging restricts access to activation switch, switch caps or locks, recessed switches, trigger locks, temperature sensitive circuit breakers, etc.); and (2) An indication of compliance with this special provision must be provided by marking each package with the words 'not restricted' or by including the words 'not restricted' on a transport document such as an air waybill accompanying the shipment. (d) Used or spent battery exception. Used or spent dry batteries of both non-rechargeable and rechargeable designs, with a marked rating up to 9-volt that are combined in the same package and transported by highway or rail for recycling, reconditioning, or disposal are not subject to this special provision or any other requirement of the HMR. Note that batteries utilizing different

chemistries (i.e., those battery chemistries specifically covered by another entry in the § 172.101 Table) as well as dry batteries with a marked rating greater than 9-volt may not be combined with used or spent batteries in the same package. Note also that this exception does not apply to batteries that have been reconditioned for reuse.”

Special Provision 340: “This entry applies only to the vessel transportation of nickel-metal hydride batteries as cargo. Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in battery-powered devices transported by vessel are not subject to the requirements of this special provision. See ‘Batteries, dry, sealed, n.o.s.’ in the § 172.101 Hazardous Materials Table (HMT) of this part for transportation requirements for nickel-metal hydride batteries transported by other modes and for nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in battery-powered devices transported by vessel. Nickel-metal hydride batteries subject to this special provision are subject only to the following requirements: (1) The batteries must be prepared and packaged for transport in a manner to prevent a dangerous evolution of heat, short circuits, and damage to terminals; and are subject to the incident reporting in accordance with § 171.16 of this subchapter if a fire, violent rupture, explosion or dangerous evolution of heat (i.e., an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a nickel metal hydride battery; and (2) when loaded in a cargo transport unit in a total quantity of 100 kg gross mass or more, the shipping paper requirements of Subpart C of this part, the manifest requirements of § 176.30 of this subchapter, and the vessel stowage requirements assigned to this entry in Column (10) of the § 172.101 Hazardous Materials Table.”

15 Regulatory information

Marking consideration (EU)

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 wheel bin symbol. According to COMMISSION REGULATION (EU) No 1103/2010 portable secondary (rechargeable) batteries and accumulators shall be marked with a capacity marking, except those which are incorporated or designed to be incorporated in appliances before being provided to end-users, and not intended to be removed.

International safety standards

The following cells/batteries are recognized components according to UL 2054: VH 700 AAA, VH 1300 AA, VH 1600 AA, VH 1800 AA, VH 2100 4/5A, VH 2200 AA, VH 2700 A, VH 4000 4/3A, VH 4500 4/3FA.

Water hazard class

The regulations of the German Federal Water Management Act (WHG) are not applicable as VARTA rechargeable nickel metal hydride cylindrical cells and batteries are articles and not substances, thus there is no risk of water pollution, except the batteries are violated or dismantled.

16 Other information

Full text of Hazard Statements referred to under section 3

H225	Highly flammable liquid and vapour.
H228	Flammable solid.
H250	Catches fire spontaneously if exposed to air.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.

continued on next page

Full text of Hazard Statements referred to under section 3 (continued)

H301	Toxic if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer
H350i	May cause cancer by inhalation.
H351	Suspected of causing cancer.
H360D	May damage the unborn child.
H360FD	May damage fertility. May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Note: Date of issue of the transport regulations: ADR 2019, RID 2019, IATA DGR 2020 (61st edition), IMDG Code 2018, DOT / 49 CFR 2019.
Latest covered modification of the European Battery Directive 2006/66/EC: Directive (EU) 2018/849.

RoHS: See special [Declaration](#)

REACH: See special [Declaration](#)

Issued by: VARTA Microbattery GmbH
Quality / Environmental Management

Contact: <https://www.varta-microbattery.com/contact/?lang=en>

Updates: Current SDS can be downloaded from VARTA's web page
<https://products.varta-microbattery.com/en/news-downloads/document-search.html>
(select Document Type "MATERIAL SAFETY DATA SHEET").