1 Identification of the product and of the company undertaking

Product details

Trade name: VARTA rechargeable nickel metal hydride button cells
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/...


Supplier details

Address: VARTA Microbattery GmbH
Daimlerstraße 1
D-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 button cells 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

<table>
<thead>
<tr>
<th>Contents</th>
<th>CAS no.</th>
<th>EC no.</th>
<th>Material</th>
<th>Hazard Categories</th>
<th>Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 35 %</td>
<td>proprietary</td>
<td>proprietary</td>
<td>Mischmetal nickel alloy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 – 40 %</td>
<td>12054-48-7</td>
<td>235-008-5</td>
<td>Nickel hydroxide</td>
<td>Acute Tox. 4, Aquatic Acute 1, Aquatic Chronic 1, Carc. 1A, Muta. 2, Repr. 1B, Resp. Sens. 1, Skin Irrit. 2, Skin Sens. 1, STOT RE 1</td>
<td>H302, H315, H317, H332, H334, H341, H350i, H360D, H372, H400, H410</td>
</tr>
<tr>
<td>3 – 10 %</td>
<td>proprietary</td>
<td>proprietary</td>
<td>Polymers (including external coating and insulation material)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 %</td>
<td>proprietary</td>
<td>proprietary</td>
<td>Cobalt and compounds</td>
<td>Acute Tox. 4, Aquatic Acute 1, Aquatic Chronic 1, Skin Sens. 1</td>
<td>H302, H317, H400, H410</td>
</tr>
<tr>
<td>&lt; 0.3 %</td>
<td>1310-73-2</td>
<td>215-185-5</td>
<td>Sodium hydroxide</td>
<td>Skin Corr. 1A</td>
<td>H314</td>
</tr>
<tr>
<td>&lt; 0.1 %</td>
<td>1310-65-2</td>
<td>215-183-4</td>
<td>Lithium hydroxide</td>
<td>Acute Tox. 3, Skin Corr. 1A</td>
<td>H301, H314</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Contents</th>
<th>CAS no.</th>
<th>EC no.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 15 mg/kg</td>
<td>7439-92-1</td>
<td>231-100-4</td>
<td>Lead (none intentionally introduced)</td>
</tr>
<tr>
<td>&lt; 1 mg/kg</td>
<td>7439-97-6</td>
<td>231-106-7</td>
<td>Mercury (none intentionally introduced, see section 12)</td>
</tr>
<tr>
<td>&lt; 5 mg/kg</td>
<td>7440-43-9</td>
<td>231-152-8</td>
<td>Cadmium</td>
</tr>
</tbody>
</table>

### 4 First-aid measures

#### Measures at accidental release

- **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.
- **After ingestion of battery:** In the event of battery ingestion, seek immediate medical attention at a hospital emergency room. Do not let the person who ingested the battery eat or drink until an X-ray can determine if a battery is present. If you still have the battery packaging or the device containing the battery take this with you to help the physician identify the battery type and chemistry. Further advice for the medical sector: [http://buttonbatterysafety.com](http://buttonbatterysafety.com).

See also section 7.

### 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 (CO₂) are only applicable for incipient fire.
- **Special protection equipment during firefighting:** 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. Do not drop batteries. Batteries that have been dropped by accident shall be disposed off accordingly.

Further advice for parents:
www.buttonbatterysafety.com
www.productsafety.gov.au/content/index.phtml/itemId/993224

Supply to private end users: In case the products are supplied to private end users packed with equipment or contained in equipment it is strongly recommended to follow the following rules:

The product should be marked with a graphical symbol that alerts the user to refer to the instruction manual.

The instruction manual itself should contain
• a warning marking with text to alert the user of the potential chemical burn hazard associated with coin/button battery ingestion,
• an instruction as to the presence of a coin/button cell battery,
• possible effects of battery ingestion,
• an instruction to keep batteries away from children,
• an advice to seek immediate medical attention if it suspected that batteries have either been swallowed or placed inside any part of the body.

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 button cells 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 button cells 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 button cells 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 button cells 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.
VARTA rechargeable nickel metal hydride button cells 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 button cells are considered to be “dry cell” batteries and are unregulated for purposes of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Organization (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).

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
The following cells/batteries are recognized components according to UL 2054:

- 3/V400HR, 3/V450HR, 6/V20HR, CP300H,
- e7/8h ecopack, MBU20, p10 accu, p13 accu, p312 accu, P6/8H-ULTRA, P7/8H, P7/8H-ULTRA, RTC6, V110HT, V150H,
- P6/8H-ULTRA, P7/8H, P7/8H-ULTRA, RTC6, V110HT, V150H,
- e7/8h ecopack, MBU20, p10 accu, p13 accu, p312 accu, P6/8H-ULTRA, P7/8H, P7/8H-ULTRA, RTC6, V110HT, V150H,
Water hazard class

The regulations of the German Federal Water Management Act (WHG) are not applicable as VARTA rechargeable nickel metal hydride button cells 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

<table>
<thead>
<tr>
<th>Hazard Statement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H225</td>
<td>Highly flammable liquid and vapour.</td>
</tr>
<tr>
<td>H228</td>
<td>Flammable solid.</td>
</tr>
<tr>
<td>H250</td>
<td>Catches fire spontaneously if exposed to air.</td>
</tr>
<tr>
<td>H301</td>
<td>Toxic if swallowed.</td>
</tr>
<tr>
<td>H302</td>
<td>Harmful if swallowed.</td>
</tr>
<tr>
<td>H312</td>
<td>Harmful in contact with skin.</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled.</td>
</tr>
<tr>
<td>H332</td>
<td>Harmful if inhaled.</td>
</tr>
<tr>
<td>H334</td>
<td>May cause allergy or asthma symptoms or breathing difficulties if inhaled.</td>
</tr>
<tr>
<td>H341</td>
<td>Suspected of causing genetic defects.</td>
</tr>
<tr>
<td>H345</td>
<td>May cause cancer</td>
</tr>
<tr>
<td>H350</td>
<td>May cause cancer</td>
</tr>
<tr>
<td>H351</td>
<td>Suspected of causing cancer.</td>
</tr>
<tr>
<td>H360D</td>
<td>May damage fertility or the unborn child.</td>
</tr>
<tr>
<td>H372</td>
<td>Causes damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>H373</td>
<td>May cause damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>H410</td>
<td>Very toxic to aquatic life with long lasting effects.</td>
</tr>
<tr>
<td>H411</td>
<td>Toxic to aquatic life with long lasting effects.</td>
</tr>
<tr>
<td>H412</td>
<td>Harmful to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>
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