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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Material - Safety - Data Sheet (MSDS)</b><br>for<br><b>Ansmann NiMH Batteries</b><br>single cells and multi-cell battery packs                                                                                                                                                                     | No.11<br><br>1/6 |
| Date of issue: 2012 - 01 - 30<br>Revision no: 10<br>Revision date: 2020 - 02 - 10<br>Editor: Ansmann AG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The information contained within is provided as a service to our customers and for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate at the date of preparation. ANSMANN AG makes no warranty expressed or implied. |                  |
| <b>1. Product and Supplier Identification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                       |                  |
| Product name:<br>Type:<br>Models / types:<br>Electrochemical system:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Ansmann NiMH Battery<br>Sealed rechargeable nickel-metal-hydride battery<br>Prismatic and round cells<br>Nickel hydroxide (positive electrode)<br>Metal hydroxide (negative electrode)<br>Potassium hydroxide (electrolyte)                                                                           |                  |
| Supplier:<br>Germany<br>Address:<br>Phone / Fax:<br>Home / email:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ANSMANN AG<br>Industriestraße 10; 97959 Assamstadt; Germany<br>+ 49 (0) 6294 42040 / + 49 (0) 6294 420444<br>ansmann.de / info@ansmann.de                                                                                                                                                             |                  |
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| EMERGENCY CONTACT:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | For chemical emergency only (spill, leak, fire, exposure or accident)<br>call phone no.: +49 6294 4204 0                                                                                                                                                                                              |                  |
| <b>2. Hazards Identification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                       |                  |
| <p>The rechargeable NiMH batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer and as long as their integrity is maintained.</p> <p>Do not short circuit, puncture, incinerate, crush, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion.</p> <p>Under normal conditions of use, the active materials and liquid electrolyte contained in the cells and batteries are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the opening of the valves and/or the rupture of the battery container. Electrolyte leakage or battery vent/explosion/fire may follow, depending upon the circumstances.</p> |                                                                                                                                                                                                                                                                                                       |                  |



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### 3. Composition and Informations on Ingredients

Each cell consists of a hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.

| Ingredient                            | Content  | CAS No.    | Hazard Symbols                                                                                                                                                                                                                                         | Classification          | R Phrases                                      |
|---------------------------------------|----------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------|
| Nickel (Ni)<br>powder                 | 30 - 45% | 7440-02-0  |    | GHS02,GHS07<br>GHS08    | 17, 40, 43<br>48/23                            |
| Nickel Hydroxide<br>$\text{Ni(OH)}_2$ | 20 - 30% | 12054-48-7 |    | GHS07<br>GHS08<br>GHS09 | 49, 61, 20/22<br>38, 68, 42/43<br>48/23, 50/53 |
| Cobalt (Co)                           | 1 - 5%   | 7440-48-4  |                                                                                      | GHS02<br>GHS08          | 42/43<br>53                                    |
| Manganese<br>(Mn)                     | 1 - 3%   | 7439-96-5  |                                                                                                                                                                       | GHS02                   | 11,15                                          |
| Zinc (Zn)                             | < 3%     | 7440-66-6  |    | GHS02,GHS07<br>GHS09    | 11,19<br>36/37, 51/53                          |
| Aluminum<br>(Al)                      | 0 - 2%   | 7429-90-5  |                                                                                                                                                                       |                         | 50                                             |
| Lanthanum<br>(Ln)                     | < 10%    | 7439-91-0  |                                                                                                                                                                     | GHS02                   | 14/15                                          |
| Cerium<br>(Cer)                       | < 10%    | 7440-45-1  |                                                                                  | GHS02<br>GHS07          | 11, 15, 20/21/22<br>36/37/38                   |
| Neodymium<br>(Nd)                     | < 10%    | 7440-00-8  |                                                                                  | GHS02<br>GHS07          | 11, 14<br>36/37/38                             |
| Potassium Hydroxide<br>(KOH)          | 5 - 10%  | 1310-58-3  |                                                                                  | GHS05<br>GHS07          | 32, 35                                         |
| Sodium Hydroxide<br>(NaOH)            | 0 - 5%   | 1310-73-2  |                                                                                                                                                                     | GHS05                   | 35                                             |
| Lithium Hydroxide<br>(LiOH)           | 0 - 4%   | 1310-65-2  |                                                                                  | GHS05<br>GHS06          | 22, 33, 35                                     |
| Stainless Steel (Fe)                  | 15 - 30% | 7439-89-6  |                                                                                                                                                                                                                                                        |                         |                                                |

### 4. First Aid Measures

In case of accumulator breakage or burst, please evacuate employees from the contaminated area and ensure maximal ventilation in order to break-up corrosive gas, smoke and unpleasant odours.

If it occurs, by accident, following measures must be taken:

**Inhalation:** Provide fresh air. In severe cases obtain medical attention.

**Skin Contact:** Wash off skin thoroughly with water. Remove contaminated clothing and wash before re-use. In severe cases obtain medical attention.

**Eye Contact:** Irrigate thoroughly with water for at least 15 minutes. Lifting upper and lower lids, until no evidence of the chemical remains. Obtain medical attention.

**Ingestion:** Wash out mouth thoroughly with water. Do not induce vomiting or give food or drink. Seek medical attention immediately.

**Further treatment:** All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapours should be seen by a doctor.



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### 5. Fire Fighting Measures

If fire or explosion occurs when batteries are on charge, shut off power to charger.

In case of fire where nickel metal hydride batteries are present, apply a smothering agent such as METL-X, sand, dry ground dolomite, or soda ash, or flood the area with water. A smothering agent will extinguish burning nickel metal hydride batteries. Water may not extinguish burning batteries but will cool the adjacent batteries and control the spread of fire. Burning batteries will not burn themselves out. Virtually all fires involving nickel metal hydride batteries can be controlled with water. When water is used, however, hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended.

Fire fighters should wear self-contained breathing apparatus. Burning nickel metal hydride batteries can produce toxic fumes including oxides of nickel, cobalt, aluminum, lanthanum, cerium and neodymium

### 6. Accidental Release Measures

Remove personnel from area until fumes dissipate. Do not breathe vapours or touch liquid with bare hands. Provide sufficient room ventilation if required.

If the skin has come into contact with the electrolyte, it should be washed thoroughly with water.

Use neoprene or natural rubber gloves and protective glasses, if handling an open or leaking battery. Battery materials should be collected in a leak-proof container and disposed of as Special Waste in accordance with local regulations.

### 7. Precautions for safe Handling and Use

**Storage:** Store in a cool (preferable below 25°C), well ventilated area, away from moisture, sources of heat, and open flames.  
Elevated temperatures can result in shortened battery life. Temperatures above 70°C may result in battery leakage and rupture.  
Keep adequate clearance between walls and batteries.  
Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.

**Handling:** Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods, which would end up into excessive heating.  
Do not directly heat or solder. Do not throw into fire.  
Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non conductive (i.e. plastic) trays.  
Do not disassemble, mutilate or mechanically abuse cells and batteries.  
In order to prevent seal or safety vent damage, never solder the batteries directly at the battery terminals.

**Charging:** This battery is made to be charged many times. Use only specified charger.  
Follow manufacturer data in respect of charge current and charge time.  
Note correct polarity. Improper charging can cause heat damage or even high pressure rupture.

**Disposal:** Dispose in accordance with all applicable federal, state and local regulations.

### 8. Special Protection Information

**Ventilation Requirements:** Not necessary under normal conditions. Room ventilation may be required in areas where there are open or leaking batteries.

**Respiratory Protection:**  Not necessary under normal conditions. Avoid exposure to electrolyte fumes from open or leaking battery. In all fire situations use self-contained breathing apparatus

**Eye Protection:**  Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

**Hand Protection:**  Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery



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## 9. Physical and Chemical Properties

**Note:** The following points are not applicable unless in case of leaking or damaged batteries with exposed internal components.

|                           |                                                                        |
|---------------------------|------------------------------------------------------------------------|
| <b>Appearance:</b>        | Nickel plated steel cylindrical cell, eventually sleeved.              |
| <b>Odour:</b>             | Odourless (unless in case of damaged product with leaking electrolyte) |
| <b>Flashpoint:</b>        | Not applicable                                                         |
| <b>Flammability:</b>      | Not applicable                                                         |
| <b>Relative density:</b>  | > 2 g/cm <sup>3</sup>                                                  |
| <b>Specific energy:</b>   | 30...90Wh/kg                                                           |
| <b>Temperature range:</b> | Usage recommended between -40°C and +70°C.                             |

## 10. Stability and Reactivity

Product is stable under conditions described in Section 7.

**Conditions to avoid:** Heat above 70° or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Short circuit. Expose over a long period to humid conditions.

**Materials to avoid:** Strong mineral acids, alkali solutions, strong oxidising materials and conductive materials.

**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

Nickel metal hydride batteries are not hazardous waste. Under normal conditions of use, Ni-MH batteries are non-toxic.

In case of can opening or destruction, the following substances can be released:

| Substances          |                                        |                     | Hazards                     |                                                                                              |                                                |
|---------------------|----------------------------------------|---------------------|-----------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------|
| Name                | N° EC<br>N° CAS<br>N° EINEC            | Symbol              | Effects                     | Dust exposure limits                                                                         | Carcinogenicity<br>mutagenicity<br>protoxicity |
| Nickel              | 028-002-00-7<br>7440-02-0<br>231-111-4 | Ni                  | Xn                          | Nocif                                                                                        | R 40-43<br>R 17                                |
| Nickel-Hydroxyde    | 028-008-x*<br>12054-48-7<br>235-008-5  | Ni(OH) <sub>2</sub> | LD50/oral/rat:<br>1600mg/kg | VME: 1000µg/m <sup>3</sup><br>VLE: /                                                         | Occupational                                   |
| Cobalt-Hydroxyde    | -<br>21041-93-0<br>244-166-4           | Co(OH) <sub>2</sub> | LD50/oral/rat:<br>795mg/kg  | VME: 100µg/m <sup>3</sup><br>VLE: /                                                          | /                                              |
| Alkaline-Hydroxydes | 019-002-00-8<br>1310-58-3              | KOH<br>NaOH<br>LiOH | LD50/oral/rat:<br>365mg/kg  | KOH VME: 2mg/m <sup>3</sup><br>NaOH VME: 2mg/m <sup>3</sup><br>LiOH VME: 25µg/m <sup>3</sup> | /                                              |

## 12. Ecological Information

The sealed NiMH cells as a product are not presenting ecotoxicological hazards. In case of product destruction or opening, the substances described in paragraph 11 can come in contact of the environment. The metals content in a NiMH battery are toxics for the environment.

If not recycled, it must be disposed of in accordance with all state and local regulations.

Ansmann NiMH cells and batteries belong to the group of **mercury free** batteries. They do not contain mercury, lead and cadmium as defined by the European directive 2006/66/EC Article 21.



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### 13. Disposal Considerations

USA: NiMH 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 RPBC website at [www.rbbc.org](http://www.rbbc.org) ( [www.call2recycle.org](http://www.call2recycle.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](http://www.epbaeurope.net/legislation_national.html))

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

In order to avoid short circuit and heating, used 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 their original packaging
- Coverage of the terminals

### 14. Transport Information

#### General considerations

Ansmann nickel-metal hydride cylindrical cells/batteries are considered to be "dry cell" batteries and are unregulated of transportation by the U.S. Department of Transportation (DOT), International Civic Aviation Administration (ICAO), International Air Transport Association (IATA), 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).

#### IATA DGR

Special Provision A199 is a new special provision assigned against the entry for Batteries, nickel-metal hydride. The special provision identifies that UN 3496 only applies in sea transport and that - provided that nickel-metal hydride batteries are prepared in accordance with the special provision - they are "not restricted" in air transport.

Nickel-metal hydride batteries or nickel-metal hydride battery powered electronic devices or equipment, having the potential of a dangerous evolution of heat, must be prepared for transport 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) accidental 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.

**EU (ADR/RID):** Chapter 3.2 Table A: "Batteries, nickel-metal hydride, UN3496, not subject to ADR"

**USA: 49 CFR § 172.102** Special Provision 130: Nickel-metal hydride cylindrical cells/batteries are not subject to requirements of this subchapter except for the following..."Batteries and battery-powered devices 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:

- a) Packaging each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material
- b) Separating or packaging batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g. metal) in the packagings"...

Special Provision 340: This entry applies only to the vessel transportation of nickel-metal hydride batteries as cargo. (Regulated as "Batteries, nickel-metal-hydride, UN3496") [...] 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 packing or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a NiMH battery; and (2) when loaded in a cargo transport unit in a total quantity of 100kg 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.



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**International Maritime Organization (IMO), 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 100kg gross mass. When loaded in a cargo transport unit in a total quantity of 100kg 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."

### 15. Regulatory Information

| Survey of Standards: | Regulatory Body                                                                | Special Provisions                 |
|----------------------|--------------------------------------------------------------------------------|------------------------------------|
|                      | <b>ADR (2019)</b>                                                              | 295 - 304, 598                     |
|                      | <b>IMDG Code 39-18</b>                                                         | UN 3496 - Special Provision SP 963 |
|                      | <b>U.S. DOT</b>                                                                | 49 CFR 172.102 Provision 130, 340  |
|                      | <b>IATA</b> (61 <sup>st</sup> edition, effective 1 <sup>st</sup> January 2020) | A199                               |

Ni-MH 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

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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