1. Product & Company Identification and Identification of the substance/mixture

<table>
<thead>
<tr>
<th>Product:</th>
<th>Ni-Zn Rechargeable Battery (size AA, HR06)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer:</td>
<td>Conrad Electronic SE</td>
</tr>
<tr>
<td>Nominal capacity:</td>
<td>1500 mAh</td>
</tr>
<tr>
<td>Nominal voltage:</td>
<td>1.6 V</td>
</tr>
<tr>
<td>Address:</td>
<td>Klaus-Conrad-Strasse 1, D-92240 Hirschau</td>
</tr>
<tr>
<td>Telephone:</td>
<td>+49 (0) 9604 / 40 - 8988</td>
</tr>
<tr>
<td>Date of issue:</td>
<td>30.07.2014</td>
</tr>
</tbody>
</table>

Relevant identified uses of the substance or mixture and uses advised against: Application of the substance / the preparation: household & industrial power

2. Hazards identification

2.1 Classification of the substance or mixture

Hazard description:
Not Applicable

Information concerning particular hazards for human and environment:
A sealed battery is not hazardous in normal use on principle. The product has not to be labelled due to the calculation procedure of international guideline. The materials contained in this product may only represent below hazard if the integrity of the battery is compromised, physically or electrically abused.
R 20/22 Harmful by inhalation and if swallowed.
R 40 Limited evidence of a carcinogenic effect.
R 43 May cause sensitization by skin contact.
R 48 Danger of serious damage to health by prolonged exposure.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Classification system:
The classification is according to the latest edition of the EU Directive 67/548/EEC, 1999/45/EC and Regulation 1272/2008/EC, and extended by company and literature data.

2.2 Label elements

GHS label elements: Void

2.3 Other hazards:
Not available

eye damage.
3. Composition/information on ingredients

3.1 Substance: Not applicable. Please refer to 3.2 for more information.

3.2 Mixture: Please view below

Chemical characterization

Description:
Mixture of the substances listed below with nonhazardous additions.

For the wording of listed risk phrases refer to section 16.

<table>
<thead>
<tr>
<th>Dangerous components</th>
<th>nickel dihydroxide</th>
<th>48.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 12054-48-7</td>
<td>Carc. Cat. 3: Xn, Xi, N; R 20/22-40-43-50/53</td>
<td></td>
</tr>
<tr>
<td>EINECS: 235-008-5</td>
<td>Warning: 3.6/2; 4.1.A/1, 4.1.C/1; 3.1.O/4, 3.1.I/4, 3.4.S/1</td>
<td></td>
</tr>
<tr>
<td>EU number: 028-008-00-X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| CAS: 1314-13-2      | zinc oxide | 36.5% |
| EINECS: 215-222-5   | N; R 50/53 |       |
| EU number: 030-013-00-7 | Warning: 4.1.A/1, 4.1.C/1 |       |

| CAS: 7440-66-6      | zinc powder - zinc dust (stabilized) | 10% |
| EINECS: 231-175-3   | N; R 50/53 |       |
| EU number: 030-002-00-7 | Warning: 4.1.A/1, 4.1.C/1 |       |

| CAS: 7440-02-0      | nickel | 2.5% |
| EINECS: 231-111-4   | Carc. Cat. 3: T, Xi; R 23-40-43-48 |       |
| EU number: 028-002-00-7 | Warning: 3.6/2; 3.4.S/1 |       |

<table>
<thead>
<tr>
<th>Non-Dangerous components</th>
<th>dibismuth trioxide</th>
<th>1.2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 1304-76-3</td>
<td>Synonym: Bi₂O₃</td>
<td></td>
</tr>
<tr>
<td>EINECS: 215-134-7</td>
<td>Synonym: Bi₂O₃</td>
<td></td>
</tr>
</tbody>
</table>

| CAS: 1344-28-1        | aluminium oxide | 1.8% |
| EINECS: 215-691-6     | Synonym: Al₂O₃ |      |

Remark:
Nickel dihydroxide (CAS No.: 12054-48-7) Synonym: Ni(OH)₂
Zinc oxide (CAS No.: 1314-13-2) Synonym: ZnO
Zinc powder - zinc dust (stabilised) (CAS No.: 7440-66-6) Synonym: Zn
Nickel (CAS No.: 7440-02-0) Synonym: Ni
Dibismuth trioxide (CAS No.: 1304-76-3) Synonym: Bi₂O₃
Aluminium oxide (CAS No.: 1344-28-1) Synonym: Al₂O₃
4. First aid measures

4.1 Description of first aid measures

If exposure to internal materials within battery due to damaged outer casing, the following actions are recommended.

General information:

Immediately remove any clothing soiled by the product.

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

Remove breathing equipment only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

After inhalation:

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably in side position for transportation.

After skin contact:

Immediately wash with water and soap and rinse thoroughly.

After eye contact:

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing:

Call for a doctor immediately.

Information for doctor:

The following symptoms may occur: Not available

Hazards: Not available

Treatment: Not available

4.2 Most important symptoms and effects, both acute and delayed:

Not available

4.3 Indication of any immediate medical attention and special treatment needed:

Not available

5. Fire fighting measures

5.1 Extinguishing media:

Suitable extinguishing agents:

CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture:

Battery may burst and release hazardous decomposition products when exposed to a fire situation.

Protective equipment: Mouth respiratory protective device.

5.3 Advice for firefighters:

Cool fire exposed batteries to prevent rupture.
6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:
Not required.

6.2 Environmental precautions:
Do not allow product to reach sewage system or any water source.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.

6.3 Methods and material for containment and cleaning up:
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

6.4 Reference to other sections:
Please view below.

7. Handling and storage

7.1 Precautions for safe handling:
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of dust.

Information about fire - and explosion protection:
Prevent impact and friction.
Protect from heat.
Protect against electrostatic charges.

7.2 Conditions for safe storage, including any incompatibilities:
Requirements to be met by storerooms and receptacles: Store in a cool location.
Information about storage in one common storage facility: Store away from flammable substances.
Further information about storage conditions: Store in cool, dry conditions in well sealed receptacles.

Incompatibilities: Not available

7.3 Specific end use(s):
Not available
8. Exposure controls, personal protection

8.1 Control parameters

Additional information about design of technical facilities: No further data; see item 7.

<table>
<thead>
<tr>
<th>Ingredients with limit values that require monitoring at the workplace:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12054-48-7 nickel dihydroxide</strong></td>
<td></td>
</tr>
<tr>
<td>WEL (Great Britain)</td>
<td>0.5 mg/m³ as Ni</td>
</tr>
<tr>
<td>VME (France)</td>
<td>1 mg/m³</td>
</tr>
<tr>
<td><strong>1314-13-2 zinc oxide</strong></td>
<td></td>
</tr>
<tr>
<td>MAK (Germany)</td>
<td>1A mg/m³ Rauch</td>
</tr>
<tr>
<td>VME (France)</td>
<td>5★ 10** mg/m³ *fumées **poussières</td>
</tr>
<tr>
<td><strong>7440-02-0 nickel</strong></td>
<td></td>
</tr>
<tr>
<td>WEL (Great Britain)</td>
<td>0.5 mg/m³ as Ni</td>
</tr>
<tr>
<td>MAK (Germany)</td>
<td>einatembare Fraktion; vgl.Abschn.XIII</td>
</tr>
<tr>
<td>VME (France)</td>
<td>1 mg/m³ C3</td>
</tr>
<tr>
<td><strong>1344-28-1 aluminium oxide</strong></td>
<td></td>
</tr>
<tr>
<td>WEL (Great Britain)</td>
<td>10★ 4** mg/m³ *inhalable dust **respirable dust</td>
</tr>
<tr>
<td>AGW (Germany)</td>
<td>3★ 10** mg/m³</td>
</tr>
<tr>
<td>VME (France)</td>
<td>2(II).*alveolengängige **einatembare Fraktion; AGS</td>
</tr>
<tr>
<td></td>
<td>10 mg/m³</td>
</tr>
</tbody>
</table>

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls: Not available

Personal protective equipment:

General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the skin.

Avoid contact with the eyes and skin.

Respiratory protection:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Protection of hands:

**Protective gloves**

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

**Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

**Penetration time of glove material:**

The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

**Eye protection:**

Not required.

9. Chemical and Physical Properties

9.1 Information on basic physical and chemical properties:

**General information**

**Form:** Solid

**Colour:** Silver grey

**Odour:** Odourless

**Change in condition:**

- Melting point/Melting range: Not available
- Boiling point/Boiling range: Not available
- Freezing point: Not available

**Flash point:** Not available

**Flammability (solid, gaseous):** Not available

**Ignition temperature:** Not available

**Decomposition temperature:** Not available

**Self-igniting:** Product is not selfigniting.

**Danger of explosion:** Product does not present an explosion hazard.

**Explosion limits:**

- Lower: Not available
- Upper: Not available

**Oxidizing properties:** Not available

**Density:** Not available

**Relative density:** Not available

**Vapour density:** Not available

**Evaporation rate:** Not available

**Solubility in / Miscibility with water:** Not available
pH-value: Not available
Partition coefficient (n-octanol/water): Not available
Segregation coefficient (n-octanol/water): Not available
Viscosity: Dynamic: Not available.
9.2 Other information:
Not available

10. Stability and reactivity

10.1 Reactivity:
No decomposition if used according to specifications.

10.2 Chemical stability:
Not available

10.3 Possibility of hazardous reactions:
Not available

10.4 Conditions to avoid:
Not available

10.5 Incompatible materials:
Not available

Materials to be avoided:

Dangerous reactions: No dangerous reactions known.

10.6 Hazardous decomposition products: Not available
11. Toxicological information
11.1 Information on toxicological effects

Acute toxicity:
LD/LC50 values relevant for classification:

<table>
<thead>
<tr>
<th>Substance</th>
<th>LD/LC50 Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1314-13-2 zinc oxide</td>
<td>Oral LD50 &gt; 5000 mg/kg (rat)</td>
<td></td>
</tr>
<tr>
<td>1304-76-3 dibismuth trioxide</td>
<td>Oral LD50 5000 mg/kg (rat)</td>
<td></td>
</tr>
</tbody>
</table>

Primary irritant effect  
- on the skin: Irritating effect possible.
- on the eye: Irritating effect possible.

Sensitization: Sensitization possible through inhalation.
Sensitization possible through skin contact.

Additional toxicological information:
The product shows the following dangers if electrolyte leakage occurs according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
- Toxic
- Harmful
- Irritant
- Carcinogenic if inhaled.

Toxicokinetics, metabolism and distribution: Not available
Acute effects (acute toxicity, irritation and corrosivity): Not available
Repeated dose toxicity: Not available

12. Ecological information

12.1 Toxicity: Not available
12.2 Persistence and degradability: Not available
12.3 Bioaccumulative potential: Not available
12.4 Mobility in soil: Not available
12.5 Results of PBT and vPvB assessment: Not available
12.6 Other adverse effects: Not available

Additional ecological information:
General notes:
Water hazard class 3 (German Regulation) (Self-assessment): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
Very toxic for aquatic organisms.
13. Disposal considerations

13.1 Waste treatment methods

Product

Recommendation: Must not be disposed together with household garbage. Do not allow product to reach sewage system.

Uncleaned packaging

Recommendation: Disposal must be made according to official regulations.

14. Transport information

14.1 Land transport ADR/RID (cross-border)

14.1.1 ADR/RID class: -

Danger code (Kemler): -

14.1.2 UN-Number: -

14.1.3 Packaging group: -

14.1.4 Description of goods: -

Limited quantities (LQ): -

Transport category: -

14.2 Maritime transport IMDG

14.2.1 IMDG Class: -

14.2.2 UN Number: -

Label: -

14.2.3 Packaging group: -

EMS Number: -

Marine pollutant: No

14.2.4 Proper shipping name: -

14.3 Air transport ICAO-TI and IATA-DGR

14.3.1 ICAO/IATA Class: -

14.3.2 UN/ID Number: -

Label: -

14.3.3 Packaging group: -

14.3.4 Proper shipping name: -

14.4 Environmental hazards: Not available

14.5 Special precautions for users:

Batteries may explode or leak if inserted improperly, recharged or disposed of in fire. Do not mix with nonalkaline or used batteries.

14.6 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

The batteries must be packaged in a manner that prevents the generation of a dangerous quantity of heat and short circuits.
15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Sara

Section 335 (extremely hazardous substances):
None of the ingredients is listed.

Section 313 (specific toxic chemical listings):

- 12054-48-7 nickel dihydroxide
- 7440-02-0 nickel
- 1344-28-1 aluminium oxide

TSCA (Toxic Substances Control Act):

- 12054-48-7 nickel dihydroxide
- 1314-13-2 zinc oxide
- 7440-02-0 nickel
- 1344-28-1 aluminium oxide
- 1304-76-3 dibismuth trioxide

Proposition 65

Chemical known to cause cancer:

- 12054-48-7 nickel dihydroxide
- 7440-02-0 nickel

Chemicals known to cause reproductive toxicity for females:
None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for males:
None of the ingredients is listed.

Chemicals known to cause developmental toxicity:
None of the ingredients is listed.

Cancerogenity categories

EPA (Environmental Protection Agency)

- 1314-13-2 zinc oxide II
- 7440-66-6 zinc powder -zinc dust (stabilized) II

IARC (International Agency for Research on Cancer)

- 12054-48-7 nickel dihydroxide 1
- 7440-02-0 nickel 2B

NTP (National Toxicology Program)

- 12054-48-7 nickel dihydroxide K
- 7440-02-0 nickel R

TLV (Threshold Limit Value established by ACGIH)

- 12054-48-7 nickel dihydroxide A1
- 7440-02-0 nickel A5
- 1344-28-1 aluminium oxide A4

MAK (German Maximum Workplace Concentration)

- 12054-48-7 nickel dihydroxide 1
- 7440-02-0 nickel 1
- 1344-28-1 aluminium oxide 2

NIOSH-Ca (National Institution for Occupational Safety & Health)

- 12054-48-7 nickel dihydroxide
- 7440-02-0 nickel

OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients is listed.
Labelling according to EU guidelines:
The substance is not subject to classification according to Directive 67/548, 1999/45/EC and 1272/2008/EC. Observe the general safety regulations when handling chemicals.

Hazard-determining components of labelling:
nickel dihydroxide
nickel

Risk phrases:
20/22 Harmful by inhalation and if swallowed.
40 Limited evidence of a carcinogenic effect.
43 May cause sensitization by skin contact.
48 Danger of serious damage to health by prolonged exposure.
50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases:
2 Keep out of the reach of children.
29/56 Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point.
36/37 Wear suitable protective clothing and gloves.
46 If swallowed, seek medical advice immediately and show this container or label.

National regulations
Candidate List of Substances of very high concern (SVHC) according to ECHA (18/06/2010)
None of the ingredients is listed

REACH Regulation Annex XVII Restriction List
None of the ingredients is listed

REACH Regulation Annex XIV Authorization Recommendation List
None of the ingredients is listed

15.2 Chemical safety assessment:
Not available
16. Other Information


DISCLAIMER OF LIABILITY

The information in this MSDS/SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in anyway connected with the handling, storage, use or disposal of the product. This MSDS/SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS/SDS information may not be applicable.

Relevant R-phrases

20/22 Harmful by inhalation and if swallowed.
23 Toxic by inhalation.
40 Limited evidence of a carcinogenic effect.
43 May cause sensitization by skin contact.
48 Danger of serious damage to health by prolonged exposure.
50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent