MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name: POSITIVE ELECTRODE

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
   Trade name: POSITIVE ELECTRODE
   Synonyms: POSITIVE ELECTRODE PLATE

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Intended or recommended use of the mixture: Positive electrode intended for manufacturing of Ni-Cd accumulators. Positive electrode containing positive accumulator mass is intended for assembling Ni-Cd or Ni-Fe accumulators. The electrode is delivered without electrolyte in non-formed state as a semi-factured product for further manufacturing of Ni-Cd or Ni-Fe accumulators.
   Uses advised against: The mixture should not be used for any other purpose than determined.

1.3 Details of the supplier of the safety data sheet
   Trade name: BOCHEMIE a.s.
   Address: Lidická 326, 735 95 Bohumín, Czech Republic
   Company ID: 276 54 087
   Phone number / Fax: +420 596 091 111 / +420 596 013 462
   e-mail: bochemie@bochemie.cz
   e-mail of person responsible for the Safety Data Sheet: MSDS@bochemie.cz

1.4 Emergency telephone number: 224 91 92 93; 224 91 54 02; 224 91 45 71
   Toxikologické informační středisko, Na Bojišti 1, 128 08 Praha 2, CZ

SECTION 2: HAZARDS IDENTIFICATION

Positive electrode by reason of positive accumulator mass is classified according to Directive 1999/45/EC and Regulation 1272/2008/EC.

2.1 Classification of the substance or mixture
   According to Directive 1999/45/EC
      Carcinogenic: Carc. cat. 1 R49; Xn - harmful R20/22; Mutagenic: Muta. cat. 3 R68; Xi - Irritant R38; Toxic for reproduction: Repr. cat. 2 R61; T - Toxic 48/23; N – dangerous for the environment R50/53; Sensitising - R42/43
   According to Regulation No 1272/2008/EC
      Carc. 1A H350i; Repr. 1B H360D; Muta.2 H341; STOT RE 1 H372; Acute Tox. 4 H332; Acute Tox. 4 H302; Skin Irrit. 2 H315; Resp. Sens. 1 H334; Skin Sens. 1 H317; Aquatic Acute 1 H400; Aquatic Chronic 1 H410
   - For the full wording of R-sentences and shortcut see section 16, full wording of hazard statements see section 2.2
   - The most important adverse physicochemical, human health and environmental effects:
      The mixture is harmful by inhalation and if swallowed. Danger of irreversible effects – Carc. cat., cathegory 1. The mixture classified in this way must be regarded as possible carcinogens for humans. The product may cause sensitisation by skin contact. Toxic for reproduction - may cause harm to the unborn child. Danger of serious damage to health by prolonged exposure through inhalation. Dangerous for the environment - bioaccumulation of heavy metals - the product is harmful to aquatic environment.

2.2 Label elements
   Hazard pictograms:
   - Warning sign: Danger
   - Hazard statements:
     H302+H332 Harmful if swallowed or if inhaled.
     H315 Causes skin irritation.
     H317 May cause an allergic skin reaction.
     H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
     H341 Suspected of causing genetic defects.
     H350 May cause cancer by inhalation.
     H360D May damage the unborn child.
MATERIAL SAFETY DATA SHEET

Product name:

**POSITIVE ELECTRODE**

H372 Causes damage to organs through prolonged or repeated exposure by inhalation.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements:
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust.
P264 Wash hands and face thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective rubber gloves/protective clothing.
P284 Wear respiratory protection.
P308+P313 IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards
The mixture does not meet the PBT/vPvB criteria according to REACH, annex XIII.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances
Not relevant – it is not substance

3.2 Mixtures

3.2.1 Substances in the mixture

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>(%)</th>
<th>EC CAS Index. number</th>
<th>Classification acc. to Directive 67/548/EEC</th>
<th>Classification acc. to regulation 1272/2008/EC, CLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>68 – 75</td>
<td>235-008-5 12054-48-7 028-008-00-X</td>
<td>Carc. Cat. 1 R49; Muta. Cat. 3 R68; Repr. Cat. 2 R61; Tox. Cat. 4 R48/23; Xn – R20/22; Xi – R38; R42/43; N – R50/53</td>
<td>Carc. 1A H350; Repr. 1B H360D; Muta.2 H341; STOT RE 1 H372; Acute Tox. 4 H332; Acute Tox. 4 H302; Skin Irrit. 2 H315; Resp. Sens. 1 H334; Skin Sens. 1 H317; Aquatic Acute 1 H400; Aquatic Chronic 1 H410</td>
</tr>
<tr>
<td>Cobalt dihydroxide</td>
<td>0,8 – 4,2</td>
<td>244-166-4 21041-93-0</td>
<td>Xn, N; Repr. Cat. 2 R61; Tox. Cat. 4 R48/23; Xn – R20/22; Xi – R38; R42/43; N – R50/53</td>
<td>Acute Tox. 4, Eye Irrit. 2, Resp. Sens. 1B, Skin Sens. 1, Aquatic Acute 1, Aquatic Chronic 1, H332- H302-H319-H334-H317-H400-H410</td>
</tr>
</tbody>
</table>

For the full wording of all classifications, R-sentences and hazard statements see section 16

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

**Inhalation**: Shut off source of exposure, if possible. Bring the victim to the fresh air, keep at rest (avoid even walking if necessary, seek medical attention.

**Skin contact**: Take off contaminated clothing and shoes. Wash thoroughly with water and soap. Use protective cream on the skin, obtain medical attention.

**Eye contact**: Flush immediately with large amounts of fresh water at least 10 minutes, to get the water under the eyelids, seek medical attention.

**Ingestion**: Rinse mouth with potable water. Immediately after ingestion (within 5 minutes after ingestion), induce vomiting. Later, do not induce vomiting, immediately provide emergency medical assistance.

4.2 Most important symptoms and effects, both acute and delayed
The mixture is harmful by inhalation and if swallowed. Danger of irreversible effects – Carc. cat., cathegory 1. The mixture classified in this way must be regarded as possible carcinogenes for humans. The product may cause sensitisation by skin contact. Toxic for reproduction - may cause harm to the unborn child, danger of serious damage to health by prolonged exposure through inhalation.

4.3 Indication of any immediate medical attention and special treatment needed
In case of eyes contact, ingestion and in other health problems or should the symptoms persist, always seek medical advice and provide information contained in this MSDS. In all cases, ensure the physical and mental peace and to prevent cold. Application of anti-shock measures, maintenance of vital functions.

SECTION 5: FIREFIGHTING MEASURES
MATERIAL SAFETY DATA SHEET


Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name: POSITIVE ELECTRODE

5.1 Extinguishing media

Suitable: non-flammable mixture. Use extinguishing media according to the character of the fire.
Unsuitable: Not known. Do not use water – risk of release to the sewers and environment.

5.2 Special hazards arising from the substance or mixture

Danger of dust-swirling, risk of intrusion into the aquatic environment

5.3 Advice for fire fighters

In case fires wear full protective clothing, eyes protection and suitable respiratory system protection. In case of release to the sewers act upon emergency plans (capturing and/or diluting with water).

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel
Wear suitable personal protective equipment. Avoid contact with skin and eyes, respiratory system. Do not use the mixture in the closed area. Ensure good ventilation/exhaustion at workplace or use of protective equipment for respiratory system. Avoid contamination of the environment and employees, and avoid dust-Swirling. Do not eat, drink and smoke when handling the product.

6.1.2 For emergency responders
Wear suitable personal protective equipment. Avoid contact with skin and eyes, respiratory system. Do not use the mixture in the closed area. Ensure good ventilation/exhaustion at workplace and use of protective equipment for respiratory system. Avoid contamination of the environment and people, and avoid dust-Swirling. Do not eat, drink and smoke when handling the product. Avoid release to the environment, contact to water and dampness.

6.2 Environmental precautions

In case of accidental discharge into sewers, water courses or environment ensure collecting of cobalt and nickel compounds (coagulation, neutralisation, membrane processes etc.) or dilute the product with sufficient amount of water and notify local authorities according to local regulations. (e.g. fire brigade, police, rescue police, water course administrator).

6.3 Methods and material for containment and cleaning up

Avoid intrusion into drains and watercourses. Wear suitable protective clothes and respiratory system protection. Hoover carefully the product (or brush it off) and collect into lockable containers. Hoover affected surface (vacuum cleaner) and subsequently flush by water (according to local conditions) – in case that effluent treatment is provided (metal arresting e.g. by membrane processes, neutralisation or coagulation e.g. by sodium hydroxide solution). In case of released into drains or water courses, proceed in accordance with the emergency plans.

6.4 Reference to other sections

See section 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid excessive contamination of employees and environment. Wear suitable personal protective equipment. Do NOT eat, drink and smoke when handling the product. Avoid release to the environment. Manipulate only with undamaged sealed packaging and on suitable areas with the protect against leak to the environment and especially to the aquatic environment. All spilled material to collect into a tight package (using the prescribed protective equipment).

7.2 Conditions for safe storage, including any incompatibilities
Store the product in tightly closed original containers, in dry and closed storage with protect against weather conditions and rainfall, apart from drinking water, food, beverages and feed.

7.3 Specific and use(s)
Important information is provided by material data safety sheet, by instructions on the label or on the company web pages – Bochemie a.s. (www.bochemie.cz).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Exposure limits values in accordance Regulation of Government No. 361/2007 of Czech Act Collection in last wording.
MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name: POSITIVE ELECTRODE

<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS</th>
<th>PEL (mg/m³)</th>
<th>NPK-P (mg/m³)</th>
<th>Conversion factor to ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel compounds (like Ni)</td>
<td>7440-48-4</td>
<td>0.05</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Cobalt compounds (like Co)</td>
<td>7440-48-4</td>
<td>0.05</td>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

OSHA: 1 mg Ni/m³ (8h); NIOSH: 0.015 mg Ni/m³ (recommended limit for 10 hours shift);
ACGIH 0.2 mg Ni/m³ (recommended limit for 8 hours shift)

8.1.2 Biological limit values
Decree No 432/2003 of Czech Act Collection does not set indication limits of biological exposure tests.

8.1.3 Information monitoring procedures
Monitor the concentration in the workplace according to the provisions of Regulation of Government No. 361/2007 of Czech Act Collection in last wording.

8.1.4 Value of DNEL and PNEC
Not estimated for this mixture.

Nickel Dihydroxide

DNEL

<table>
<thead>
<tr>
<th>Worker</th>
<th>Acute</th>
<th>Systemic</th>
<th>DNEL_{acu} = 0.52 mg Ni/l, NOAEC: 3.9 mg Ni/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term</td>
<td>Systemic</td>
<td>DNEL_{loc} = 3.9 mg Ni/m³, NOAEC: 3.9 mg Ni/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>DNEL_{loc} = 0.05 mg Ni/m³</td>
<td></td>
</tr>
</tbody>
</table>

PNEC

<table>
<thead>
<tr>
<th>Direction</th>
<th>PNEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater</td>
<td>3.6 µg Ni/l</td>
</tr>
<tr>
<td>Seawater</td>
<td>8.6 µg Ni/l</td>
</tr>
<tr>
<td>Soil</td>
<td>29.9 mg Ni/kg</td>
</tr>
<tr>
<td>STP</td>
<td>0.33 mg Ni/kg</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

8.2.1 Appropriate engineering controls
Ensure good ventilation/exhaustion at workplace. Minimize contact of workers with nickel dihydroxide. Do not drink, eat or smoke during the work. Keep usual hygienic rules for handling the product and wear suitable personal protective equipment. Only the personnel familiar with the properties of the product, with handling instructions and principles of personal and environmental protection and wearing personal protective equipment is allowed to handle the product. Contaminated clothes can be reused only after thorough cleanup. Wash hands and face by drinking water and soap and flush mouth with drinking water before eating and at the end of working shift.

8.2.2 Individual protection measures, such as personal protective equipment

Eye/face protection: Wear protective glasses and protective shield – in case of danger contact with eyes.

Skin protection: Protective clothing, closed shoes.

Hand protection: Wear rubber (latex) gloves.

Respiratory protection: Ensure suitable aspirators. Wear suitable respiratory system protection (with a filter against dust, respirator).

8.2.3 Environmental exposure controls
Observe instructions for handling and storage, particularly ensure provisions preventing spill of concentrated mixture into watercourses, soil and sewerage (for further information see Handling Conditions according to Act No 254/2001 of Czech Act Coll., on Waters).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance (at 20°C): solid, Product – electrode contains in closed space gray-green or gray-black dust particles (positive accumulator mass)

Colour: grey-green or grey-black dust particles

Odour: odourless

Odour threshold: not estimated

pH (at 20°C): not estimated

Melting point: above 230

Freezing point: not estimated
MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name:
POSITIVE ELECTRODE

---

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity
The mixture reacts with oxidising agents and strong mineral acids.

10.2 Chemical stability
Stable in normal conditions of usage and storage.

10.3 Possibility of hazardous reactions
Reaction with oxidising agents and strong mineral acids, the possibility of a hazardous chemical reaction.

10.4 Conditions to avoid
Avoid raised temperature above 200°C, effect of acids and alkali, rainfall and dampness.

10.5 Incompatible materials
Oxidising agents and strong mineral acids.

10.6 Hazardous decomposition products
Nickel oxides, cobalt oxides.

---

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>a) acute toxicity:</th>
<th>Not estimated for this mixture.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide Oral</td>
<td>LD50 (rat) = 5000mg/kg b.v.</td>
</tr>
<tr>
<td>Classified as Category 4. Although nickel (di)hydroxide is currently classified as Category 4, recent data using a guideline-compliant study suggests the classification should be re-evaluated for no classification. [OECD Guideline 425; OECD Guideline 401] (EPSL, 2009a, b; Reagan, 1996)</td>
<td></td>
</tr>
<tr>
<td>Dermal No studies have been found on acute toxicity by the dermal route but dermal absorption is low so toxicity is not expected. Inhalation Recent study on nickel oxide suggests no classification is warranted. Classified as Category 4. [Read across to nickel oxide OECD Guideline 403 study] (EPSL, 2009b)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b) skin corrosion/irritation:</th>
<th>The mixture irritating to skin.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>Nickel dihydroxide is classified as a Category 2 for skin irritation. [OECD Guideline 404 study] (EPSL, 2008a)</td>
</tr>
</tbody>
</table>
MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name: POSITIVE ELECTRODE

<table>
<thead>
<tr>
<th>c) serious eye damage/irritation:</th>
<th>The mixture is not classified as irritating to eyes.</th>
</tr>
</thead>
</table>
| d) respiratory or skin sensitisation: | The mixture may cause sensitization by inhalation and skin contact.
|                                 | Nickel dihydroxide Ni(OH)2 is a dermal sensitiser, cat. 1. |
|                                 | Read across from nickel oxide OECD Guideline 406 study and other animal studies] (FDRL, 1986; EPSL, 2009c; Lammintausta et al., 1985; Nielsen et al., 1992)
|                                 | Ni(OH)2 is a respiratory sensitizer. cat. 1. |
|                                 | [Read across from nickel sulphate weight of evidence evaluation of human case reports] (Block and Yeung, 1982; Malo et al., 1982; Malo et al., 1985; McConnell et al., 1973; Novey et al., 1983) |
| e) germ cell mutagenicity: | Mutagenic: Possible risk of irreversible effects. Nickel dihydroxide Ni(OH)2 is mutagenic cat.2 [Mammalian cell gene mutation assay studies] (BSL, 2008; Rosetto et al., 1994; Fletcher et al., 1994) |
| f) carcinogenicity: | Carcinogenic: May cause cancer by inhalation. Nickel dihydroxide |
|                                 | Dermal: Not relevant since negligible amount of absorption by dermal exposure. |
|                                 | Inhalation: Ni(OH)2 is currently classified as Category 1A for inhalation exposure. [Human epidemiological studies, read across to nickel oxide human epidemiological study, and read across for nickel oxide animal inhalation study] (Jarup et al., 1998; Kjellstrom et al., 1979; Elinder et al., 1995; Andersen et al., 1996; Doll et al., 1990; NTP, 1996) |
| g) reproductive toxicity: | Toxic for reproduction: May cause harm to the unborn child. Nickel dihydroxide Nickel dihydroxide is a Category 1B reproductive toxicant. [Read across from nickel sulphate OECD Guideline 416-2 generation study] (SLI, 2000) |
| h) STOT-single exposure: | Available data do not indicate potential for single target organ toxicity. Nickel dihydroxide STOT –single exposure: Available data do not indicate potential for single target organ toxicity |
| i) STOT-repeated exposure: | Causes damage to organs through prolonged or repeated exposure by inhalation. Nickel dihydroxide STOT-repeated exposure: Oral - Lack of toxicity demonstrated in available studies. Dermal - Lack of toxicity from dermal exposure since dermal absorption is negligible. Inhalation - Classified as Category 1 for inhalation exposure due to lung effects. LOAEC: 0.5 mg Ni/m3 [Data from read across to nickel oxide animal inhalation study] (NTP, 1996) |
| j) aspiration hazard: | May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause cancer by inhalation. |

Description of Exposure Symptoms:
Inhalation: Strange taste in mouth. Irritating to respiratory system. Irritating to throat.
Skin contact: Irritating to skin after repeated or long-term contact. Can cause itching and burning rash around fingernails. This rash can affect whole hands and sometimes chest and face.
Eye contact: Danger of eye damage, irritating to eyes, Conjunctivitis, Lacrimation.
Ingestion: Stomach pain, sickness, vomiting, damage of mucous membranes of digestive tract.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity
MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name:
Acute toxicity not established for this mixture.

**Nickel dihydroxide**

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>Acute: 120 µg Ni/L (pH 6), 68 µg Ni/L (pH 8)</th>
<th>Reference Values (ERVs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chronic: 2.4 µg Ni/L</td>
<td></td>
</tr>
</tbody>
</table>

Short-term toxicity to aquatic invertebrates
LC50 48h: 0.013 mg Ni/L - 4970 mg Ni/L
(Schubauer-Berigan et al., 1993)
(Chapman et al., 1980), immobilization

Short-term toxicity to fish
LC50 96 h: 0.23 mg Ni/L - 350 mg Ni/L
(Hoang et al., 2002, 2004),

Long-term toxicity to aquatic invertebrates
NOEC/L(E)(C10): 1.4 µg/L - 1379 µg/L
(Stubblefield and Van Genderen, 2007)

Long-term toxicity to fish
NOEC/L(E)(C10): 40 µg Ni/L - 20760 µg Ni/L
(Deleebeeck et al., 2007),
(Hunt et al., 2002),
(Golder Associates, 2007).

Toxicity to aquatic algae and cyanobacteria
IC50 72h: 12.3 µg Ni/L - 17891 µg Ni/L

Toxicity to aquatic plants other than algae:
Higher aquatic plants growth inhibition
(freshwater): 8.2 µg Ni/L - 80 µg Ni/L
(Chapman et al., 1980),
(Hoang et al., 2002, 2004),

Toxicity to microorganisms
Inhibition of Oxygen Consumption EC50: 33 mg/L [Test for by Activated Sludge-ISO 8192]
(Çokgor et al., 2007)

Toxicity to other aquatic organisms
Amphibians (3 species): 84.5 µg Ni/L - 13147 µg Ni/L
(Hopfer et al., 1991)

Sediment toxicity
Pending outcome of sediment testing program
(Conclusion i of EU Existing Substances Risk Assessment)

Toxicity to soil macro-organisms
Macroinvertebrates (acute): 52 mg Ni/kg d.v. - 2500 mg Ni/kg d.v.
(Deleebeeck et al., 1993),
(Boyd and Williams, 2003).

Toxicity to terrestrial plants:
EC50 (acute): ≥54.5 mg/kg pldy d.v. ≤1928.2 mg/kg
(Thakali et al., 2006).

Toxicity to soil micro-organisms
Microbial processes (12 processes) (chronic): 10 mg Ni/kg - 1127 mg Ni/kg
(Willaert & Verloo, 1988),
(Rothamsted Research, 2005)

Microbial processes (12 processes) (chronic): 28 mg Ni/kg [nitrification] - 2542 mg Ni/kg [respiration]
(Smolders, 2000),
(Doelman & Haanstra, 1984)

Enzyme activity in soil (chronic): 7.9 mg Ni/kg [dehydrogenase] - 7084 mg Ni/kg [arylsulfatase activity]
(Welp, 1999)

Microbial species growth (13 species) (chronic): Range from 13 mg Ni/kg [Aspergillus clavatus]
(De Groot et al., 1998).

12.2 Persistence and degradability
Is not applicable for inorganic substances.

12.3 Bioaccumulative potential
Data are not available for this mixture. Heavy metals nickel and cobalt are bioaccumulative in the environment.

**Nickel dihydroxide**
BCF < 270
BAF = 0,3

12.4 Mobility in soil
Data are not available for this mixture. Dangerous to the aquatic environment - very toxic to aquatic organisms. Because of slight solubility, mobility of this product is limited.

**Nickel dihydroxide**

log Kp soil 2.86 [Aqua regia digestion- ISO 11466, 46 European soils](De Groot et al., 1998).

12.5 Results of PBT and vPvB assessment
The mixture does not meet the PBT/vPvB criteria according to REACH, annex XIII.

12.6 Other adverse effects
PRODUCT NAME: POSITIVE ELECTRODE

Toxicity for other environment was not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

a) Recommended Methods of Substance and Contaminated Packaging Disposal

It is dangerous waste. Personal protective equipment should be used and provisions to be applied when handling and collecting wastes regarding protection of waste spill into environment. Waste hand over to specialized competent company, if need be hand over within the framework of dangerous waste collection in your community. Used absorbents dispose of as dangerous waste. Contaminated packaging hand over to specialised company as dangerous waste.

b) Physical/chemical properties that may affect waste treatment options

The waste contains hazardous chemical substances, dangerous property is: acute and chronic toxicity, dangerous for the environment.

c) Sewage disposal shall be discouraged

Waste should not be disposed of by release to sewers.

d) Special precautions for any recommended waste treatment

Suggestion of waste classification:

- Subgroup 16 03 - off-specification batches and unused products
- 16 03 03* - inorganic wastes containing dangerous substances

- Subgroup 06 04 - metal-containing wastes other than those mentioned in 06 03
- 06 04 05* - wastes containing other heavy metals

Suggestion of waste container classification:

Containers with residues of the mixture: 15 01 10* packaging containing residues of or contaminated by dangerous substances.

Waste Legal Regulations:

Directive 2008/98/EC on waste and repealing certain Directives. If this mixture and its packaging become waste, the last user has to assign relevant waste code – European Waste Code (EWC code) according to Commission Decision (2000/532/EC).

SECTION 14: TRANSPORT INFORMATION

| 14.1 UN-No.: | UN 3077 | UN 3077 |
| 14.2 UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.; (nickel dihydroxide) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.; (nickel dihydroxide) |
| 14.3 Transport hazard class: | 9 | 9 |
| 14.4 Packing group: | III | III |
| 14.5 Environmental hazards | YES | YES |
| 14.6 Special precautions for user: | -- | -- |
| 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | -- | -- |
| 14.8 Other information | Danger code (Kemler): 90 | Danger code (Kemler): 90 |
| Limited quantities (LQ): 5 kg | Limited quantities (LQ): 5 kg |

SECTION 15: REGULATORY INFORMATION

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

Legislation regulating individual issues of the environmental protection and occupational hygiene conditions.

- Regulation No. 1907/2006/EC (REACH).
- Regulation No 1272/2008/EC (CLP).
- Government Regulation 68/2010 Coll. stipulating conditions of H&S of employees at work, as amended by related regulations.
MATERIAL SAFETY DATA SHEET

Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name:
POSITIVE ELECTRODE

Council Directive No. 98/24/EC on safety and health protection of employees from risks connected with chemical agents used at work.
Act No. 258/2000 Coll. on public health protection as amended by related regulations.

15.2 Chemical safety assessment:
A chemical safety assessment was not carried out for the mixture.

SECTION 16: OTHER INFORMATION

a) Changes during Revision of the MSDS
Version No.2.1
The changed sections are indicated with bold line:

b) A key or legend to abbreviations and acronyms used

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50</td>
<td>Effective Concentration, 50 percent</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal concentration, 50 percent</td>
</tr>
<tr>
<td>NPK-P</td>
<td>Maximum Permissible Concentration</td>
</tr>
<tr>
<td>Aquatic Acute 1</td>
<td>Hazardous to the aquatic environment cat. 1</td>
</tr>
<tr>
<td>Resp. Sens. 1</td>
<td>Respiration sensitization cat. 1</td>
</tr>
<tr>
<td>Repr. 1B</td>
<td>Reproductive toxicity cat.1B</td>
</tr>
<tr>
<td>STOT RE1</td>
<td>Specific target organ toxicity – repeated.</td>
</tr>
<tr>
<td>Aquatic Acute 1</td>
<td>Hazardous to the aquatic environment cat. 1</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistent, Bioaccumulative and Toxic</td>
</tr>
<tr>
<td>DNEL</td>
<td>Derived No Effect Level</td>
</tr>
<tr>
<td>NOEC</td>
<td>No-observed effect concentration</td>
</tr>
<tr>
<td>LCL</td>
<td>Lowest observed effect concentration</td>
</tr>
<tr>
<td>LD50</td>
<td>Lethal dose, 50 percent</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal concentration, 50 percent</td>
</tr>
<tr>
<td>IC50</td>
<td>Inhibition concentration</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
<td>Skin Irritation category 2</td>
</tr>
<tr>
<td>Muta.2</td>
<td>Germ cell mutagenicity cat. 2</td>
</tr>
<tr>
<td>Skin. Sens. 1</td>
<td>Skin sensitization cat. 1</td>
</tr>
<tr>
<td>Carc. 1A</td>
<td>Carcinogenicity cat. 1A</td>
</tr>
<tr>
<td>Acute</td>
<td>Acute toxicity cat.4</td>
</tr>
<tr>
<td>Tox.4</td>
<td>Acute toxicity cat.4</td>
</tr>
<tr>
<td>Aquatic Chronic 1</td>
<td>Hazardous to the aquatic environment cat. 1</td>
</tr>
<tr>
<td>vPvB</td>
<td>Very Persistent and Very Bioaccumulative</td>
</tr>
<tr>
<td>PNEC</td>
<td>Predicted No Effect Concentration</td>
</tr>
<tr>
<td>LOEC</td>
<td>Lowest observed effect concentration</td>
</tr>
</tbody>
</table>

Information contained herein is based on our best knowledge and current legislation, according 1907/2006/EC and Directive 2000/54/EC. Further, this Material Safety Data Sheet was elaborated on grounds of information provided by suppliers of particular components of the mixture. The MSDS contains information needed for safety of security and occupational health protection and the environmental protection. The mentioned information refers to present state of knowledge and experience and is in accordance with legislation in force. It cannot be considered warrantee of suitability or usability of the product for particular application.

c) The methods of evaluating information
The mixture was classified according to conventional method described in directive 1999/45/EC and Regulation 1272/2008/EC.

d) The key literature references and sources for data

e) List of relevant R phrases, hazard statements, safety phrases and/or precautionary statements

| R49    | May cause cancer by inhalation. |
| R61    | May cause harm to the unborn child. |
| R68    | Possible risk of irreversible effects. |
| R20/22 | Harmful by inhalation and if swallowed. |
| R48/23 | Toxic: danger of serious damage to health by prolonged exposure through inhalation. |
| R38    | Irritating to skin. |
| R42/43 | May cause sensitization by inhalation and skin contact. |
| R50/53 | Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| H350i  | May cause cancer by inhalation. |
| H360D  | May damage the unborn child. |
| H341   | Suspected of causing genetic defects. |
| H372   | Causes damage to organs through prolonged or repeated exposure. |
| H332   | Harmful if inhaled. |
| H311   | Harmful in contact with skin. |
| H302   | Harmful if swallowed. |
| H315   | Causes skin irritation. |
| H334   | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H315   | Causes skin irritation. |
MATERIAL SAFETY DATA SHEET


Date of issue: 17th October 2008
Date of revision: 30 April 2015
Previous date: 8 October 2013
Version: 2.1

Product name: POSITIVE ELECTRODE

- **H319** Causes serious eye irritation.
- **H335** May cause respiratory irritation.
- **H400** Very toxic to aquatic life.
- **H410** Very toxic to aquatic life with long lasting effects.

f) **Instructions for Training**

Personnel handling the preparation must be instructed about manipulation risks and on requirements for health and environmental protection (relevant provisions of the Labor Code as amended) and further, they must be demonstrably familiarized with dangerous properties, occupational health and environmental protection principles and first aid measures (Act No. 258/2000 Coll. on public health protection as amended).

- **Recommended Use Limitations**

The mixture should not be used for any other purpose than determined (see Clause 1.2). As specific conditions of use of the substance are beyond control of the supplier, the user is the only responsible to adapt the information and warnings contained herein to local legislation and regulations. The safety information describes the product from perspective of its safety and it cannot be deemed technical specifications of the product.