SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name: Nickel(II) hydroxide

Product Number: 283622
Brand: Aldrich
Index-No.: 028-008-00-X
CAS-No.: 12054-48-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity, Inhalation (Category 1A), H350
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Lungs, H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 **GHS Label elements, including precautionary statements**

**Pictogram**

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger</th>
</tr>
</thead>
</table>

**Hazard statement(s)**

- 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.
- H360 May damage fertility or the unborn child.
- H372 Causes damage to organs (Lungs) through prolonged or repeated exposure if inhaled.
- H410 Very toxic to aquatic life with long lasting effects.

**Precautionary statement(s)**

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe dust.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P272 Contaminated work clothing must not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P285 In case of inadequate ventilation wear respiratory protection.
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
- P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
- P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
- P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
- P362 Take off contaminated clothing and wash before reuse.
- P391 Collect spillage.
- P405 Store locked up.
- P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 **Hazards not otherwise classified (HNOC) or not covered by GHS** - none
SECTION 3: Composition/information on ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Formula</th>
<th>H$_2$NiO$_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular weight</td>
<td>92.71 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>12054-48-7</td>
</tr>
<tr>
<td>EC-No.</td>
<td>235-008-5</td>
</tr>
<tr>
<td>Index-No.</td>
<td>028-008-00-X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>Acute Tox. 4; Skin Irrit. 2;</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td></td>
<td>Resp. Sens. 1; Skin Sens. 1;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Muta. 2; Carc. 1A; Repr. 1B;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STOT RE 1; Aquatic Acute 1;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquatic Chronic 1; H302, H332,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H315, H334, H317, H341,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H350, H360, H372, H400,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H410 M-Factor - Aquatic Acute:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 - Aquatic Chronic: 10</td>
<td></td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.
4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nickel/nickel oxides
Not combustible. Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture.
**Hygiene measures**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. For precautions see section 2.2.

**7.2 Conditions for safe storage, including any incompatibilities**

**Storage conditions**
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

**Storage class**
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

**7.3 Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

**Ingredients with workplace control parameters**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks: Confirmed human carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.015 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Potential Occupational Carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEL</td>
<td>0.1 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

**Biological occupational exposure limits**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>Nickel</td>
<td>5 µg/l</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks: End of shift at end of workweek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nickel</td>
<td>30 µg/l</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks: End of shift at end of workweek</td>
</tr>
</tbody>
</table>

Aldrich - 283622
8.2 Exposure controls

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

**Full contact**
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

**Splash contact**
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

**Body Protection**
protective clothing

**Respiratory protection**
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

---

**SECTION 9: Physical and chemical properties**

9.1 **Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: powder</td>
</tr>
<tr>
<td></td>
<td>Color: light green</td>
</tr>
<tr>
<td>Odor</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
</tbody>
</table>
### Section 9: Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>e) Melting point/freezing point</td>
<td>Melting point: 230 °C (446 °F)</td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>No data available</td>
</tr>
<tr>
<td>g) Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>h) Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>i) Flammability (solid, gas)</td>
<td>The product is not flammable. - Flammability (solids)</td>
</tr>
<tr>
<td>j) Upper/lower flammability or explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>k) Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>l) Vapor density</td>
<td>No data available</td>
</tr>
<tr>
<td>m) Density</td>
<td>4.1 g/cm³</td>
</tr>
<tr>
<td></td>
<td>Relative density</td>
</tr>
<tr>
<td></td>
<td>3.821 g/cm³ - OECD Test Guideline 109</td>
</tr>
<tr>
<td>n) Water solubility</td>
<td>0.1 g/l at 20 °C (68 °F) - OECD Test Guideline 105 - insoluble</td>
</tr>
<tr>
<td>o) Partition coefficient: n-octanol/water</td>
<td>Not applicable for inorganic substances</td>
</tr>
<tr>
<td>p) Autoignition temperature</td>
<td>&gt; 400 °C (&gt; 752 °F) - Relative self-ignition temperature for solids does not ignite</td>
</tr>
<tr>
<td>q) Decomposition temperature</td>
<td>200 °C (392 °F) -</td>
</tr>
<tr>
<td>r) Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>s) Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>t) Oxidizing properties</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Other safety information
No data available

### Section 10: Stability and Reactivity

#### 10.1 Reactivity
No data available

#### 10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

#### 10.3 Possibility of hazardous reactions
Violent reactions possible with:
- Strong acids

#### 10.4 Conditions to avoid
No information available
10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Rat - male and female - 1,540 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - 4 h - 1.2 mg/l - dust/mist

Lungs, Thorax, or Respiration: Dyspnea.
Skin and Appendages: Other: Hair.
(RTECS)
LD50 Dermal - Rat - > 2,000 mg/kg
Remarks: (RTECS)
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: Irritating to skin. - 4 h
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Mild eye irritation
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
May cause allergic skin reaction. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
May cause allergy or asthma symptoms or breathing difficulties if inhaled. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Germ cell mutagenicity**
Suspected of causing genetic defects.
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 476
Result: positive

**Carcinogenicity**
Positive evidence from human epidemiological studies (inhalation)
IARC: 1 - Group 1: Carcinogenic to humans (Nickel dihydroxide)
NTP: Known - Known to be human carcinogen (Nickel dihydroxide)
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**
May damage the unborn child.

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
Inhalation - Causes damage to organs through prolonged or repeated exposure.
- Lungs
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Aspiration hazard**
No data available

### 11.2 Additional Information

**RTECS:** QR7040000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
Cough, Shortness of breath, Headache, Nausea
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### SECTION 12: Ecological information

**12.1 Toxicity**

**Toxicity to fish**
semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - 15.3 mg/l - 96 h
Remarks: (ECHA)

**Toxicity to daphnia and other aquatic invertebrates**
static test LC50 - Ceriodaphnia dubia (water flea) - 0.074 mg/l - 48 h
(US-EPA)

**Toxicity to algae**
static test ErC50 - Pseudokirchneriella subcapitata - 0.081 - 0.148 mg/l - 72 h
(OECD Test Guideline 201)

**Toxicity to bacteria**
EC50 - activated sludge - 33 mg/l - 30 min
(ISO 8192)

**Toxicity to fish (Chronic toxicity)**
flow-through test NOEC - Oncorhynchus mykiss (rainbow trout) - 0.062 mg/l - 32 d
Remarks: (ECHA)

**Toxicity to daphnia and other aquatic invertebrates (Chronic)**
semi-static test NOEC - Ceriodaphnia dubia (water flea) - 0.005 - 0.015 mg/l - 7 d
(US-EPA)
toxicity)

12.2 **Persistence and degradability**
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 **Bioaccumulative potential**
No data available

12.4 **Mobility in soil**
No data available

12.5 **Results of PBT and vPvB assessment**
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 **Endocrine disrupting properties**
No data available

12.7 **Other adverse effects**
No data available

---

**SECTION 13: Disposal considerations**

13.1 **Waste treatment methods**

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

---

**SECTION 14: Transport information**

**DOT (US)**
- UN number: 3077
- Class: 9
- Packing group: III
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Nickel dihydroxide)
- Reportable Quantity (RQ): 10 lbs
- Poison Inhalation Hazard: No

**IMDG**
- UN number: 3077
- Class: 9
- Packing group: III
- EMS-No: F-A, S-F
- Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Nickel dihydroxide)
- Marine pollutant: yes
- Marine pollutant: no

**IATA**
- UN number: 3077
- Class: 9
- Packing group: III
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Nickel dihydroxide)

**Further information**
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel dihydroxide</td>
<td>12054-48-7</td>
<td>2013-12-20</td>
</tr>
</tbody>
</table>

, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 05/25/2023 Print Date: 08/12/2023
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada.