

Nickel Oxide

Distributed by:
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Safety
Data
Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Material Type: Nickel Oxide
Synonyms: Nickel monoxide, Nickelous Oxide
Product Names: **Calcined Black Nickel Oxide**
(Calcined 'A' Grade, Calcined 'F' Grade) **Green Nickel Oxide**
(Regular Grade, 'A' Grade, 'F' Grade, Coarse Grade)
(Brown Nickel Oxide)
1313-99-1

CAS-No.:

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

Identified uses: Catalysts, Fuel cells, Frit Glass, nickel based powders from nickel oxide, nickel-containing electronics and thermally functioning ceramics, nickel-containing pigments, nickel-containing glass, Stainless, special steels and special alloys manufacturing

1.3 Details of the supplier of the safety data sheet

Company:
Laguna Clay Company
14400 Lomas Ave.
City of Industry, CA 91746
Telephone: 1-800-452-4862
Fax: 1-626-333-7694

1.4 Emergency telephone number

Emergency Contact: Chemtrec
Telephone: (703) 527-3887
Contract No.: CCN644266

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Skin Sensitization - Category 1;
Respiratory Sensitization - Category 1;
Carcinogenicity- Category 1 A;
Specific Target Organ Toxicity, Repeated exposure - Category 1
Aquatic Chronic - Category 4

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2.2 GHS Label elements, including precautionary statements

Product Identifier: Nickel Oxide

CAS No.: 1313-99-1



Pictogram GHS07

GHS08

Signal word Danger

Hazard statement(s)

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H350 May cause cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P202 Do not handle until all safety precautions have been read and understood.

P261 Avoid breathing dust/fumes/gas/mist/vapors/spray.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P501 Dispose of contents/ container to an approved waste disposal plant.

(NOTE: number of P-statements has been reduced, as per CLP regulation, the full list can be found in Section 15).

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS – none

May cause long lasting harmful effects to aquatic life

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

| Hazardous Ingredients | Typical Composition | C.A.S. Number | EINECS/EC Label No. |
|-----------------------|---------------------|---------------|---------------------|
| Nickel Oxide | >98% | 1313-99-1 | 215-215-7 |
| Nickel Hydroxide | 0.0 – 2.0% | 12054-48-7 | 235-008-05 |

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4. FIRST AID MEASURES

4.1 Description of first aid measures

Ingestion: No specific first aid required.

Inhalation: No specific first aid required.

Skin: Remove contaminated clothing, and wash affected areas thoroughly with soap and water. If skin irritation or rash occurs: Get medical advice/attention. Show label if possible.

Eyes: Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Skin contact: Rash

Eye contact: Redness

4.3 Indication of any immediate medical attention and special treatment needed

No special requirements

5. FIREFIGHTING MEASURES

5.1 Suitable Extinguishing Media

Any, type to be selected according to materials in the immediate neighborhood.

5.2 Special Risks

Non-Flammable. Extinguish surrounding fires with appropriate methods

5.3 Special Protective equipment for fire fighting

None needed. Wear protective equipment if required for other materials within immediate vicinity.

5.4 NFPA Rating

Health hazard: 2

Fire Hazard: 0

Reactivity Hazard: 0

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid generation of dusty atmospheres. Do not inhale dusts. Contaminated work clothing should not be allowed out of the workplace. Use personal protective equipment as required. Wash hands, and face thoroughly after handling.

6.2 Environmental precautions

Spillages and uncontrolled discharges must be prevented from entering waterways.

6.3 Methods and materials for containment and cleaning up

Pick up and replace in original container. Nickel-containing material is normally collected to recover nickel values.

6.4 Reference to other sections

For disposal see section 13.

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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Prevent the generation of inhalable dusts e.g. by the use of suitable ventilation. Do not inhale dust. Wear appropriate nationally approved respirators if handling is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits. Wear suitable protective clothing and gloves. Contaminated work clothing should not be allowed out of the workplace.

7.2 Conditions for safe storage, including any incompatibilities

Keep in the container supplied, and keep container closed when not in use. Local regulations should be followed regarding the storage of this product.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1.1 Exposure Limits

| Nickel Oxide (NiO) – CAS 1313-99-1 | | |
|------------------------------------|-------------------------------------|------|
| | Exposure Limit (mg/m ³) | Year |
| ACGIH TLV-TWA ¹ | 0.2 *+ as Ni | 2012 |
| UK WEL ² | 0.5 as Ni | 2011 |
| Japan | 1 as Ni | 2012 |
| Korea | 0.1 as Ni | 2006 |
| China | 1 as Ni | 2007 |

* Inhalable fraction

+ Insoluble inorganic fraction

8.1.2 Environmental Limits

PNEC's

| Compartment | Unit | PNEC |
|-------------|------------------------|------|
| Freshwater | µg Ni/L (bioavailable) | 3.55 |
| Marine | µg Ni/L | 8.6 |
| Terrestrial | mg Ni/kg | 29.9 |

DNEL's

| | Unit | DNEL |
|--------------------|---------------------------|---------------------|
| Dermal | | |
| Acute systemic | mg Ni/kg/day | - |
| Acute local | mgNi/cm ² /day | - |
| Long-term systemic | mg Ni/kg/day | - |
| Long-term local | mgNi/cm ² /day | 0.024 |
| Inhalation | | |
| Acute systemic | mgNi/m ³ | 520 |
| Acute local | mgNi/m ³ | 3.9 ¹ |
| Long-term systemic | mgNi/m ³ | 0.05 ^{2 3} |
| Long-term local | mgNi/m ³ | 0.05 ^{2 3} |

¹ Based on MMAD of 2.9 µm, increases with increasing MMAD (estimated as ≥6.4 mg Ni/m³ for exposures to particles with a MMAD of ≥30 µm.

²When handling powders of particle aerodynamic equivalent diameter (AED) below 10 µm, exposures (8h TWA) to these powders should be kept under 0.01 mg Ni/m³

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³ When exposure are solely to metallic and nickel oxides (without exposure to any other nickel compounds) and the mean particle size of the aerosol is greater than 10 µm AED (≤ 10% of aerosol mass in respirable fraction), inhalable exposure levels up to 0.2 mg Ni/m³ could be reasonably assumed to be safe.

8.2 Exposure controls

Do not inhale dust. Mechanical extraction ventilation may be required if user operations change it to other physical or chemical forms, whether as end products, intermediates or fugitive emissions, which are inhalable. Maintain airborne nickel levels as low as possible. Avoid repeated skin contact.

PPE

Respiratory protection: If required, use an approved respirator with particulate filters.

Eye protection: If required.

Hand & Skin Protection: Wear suitable protective clothing and gloves, which should be selected specifically for the working place, depending on concentration and quantity of the hazardous material (overalls and leather/rubber gloves). Wash skin thoroughly after handling and before eating, drinking or smoking. Change contaminated clothing frequently. Launder clothing and gloves as needed. Use of skin-protective barrier cream advised.

9. PHYSICAL AND CHEMICAL PROPERTIES

Solid granular dark gray material

| | |
|--|--|
| Physical state at 20°C and 101.3 kPa | Solid |
| Melting / freezing point | >1900°C |
| Boiling point | Not applicable |
| Relative Density | 6.75 g/cm ³ at 25°C |
| Vapor Pressure | Not applicable |
| Surface Tension | Not applicable |
| Water Solubility | 3.52X10 ⁻⁵ g/l at 20°C (green nickel oxide) 2.26X10 ⁻³ g/l at 20°C (black nickel oxide) |
| Partition Coefficient n-octanol/water (log value) | Not applicable |
| Flash Point | Not applicable |
| Flammability | Non-flammable |
| Explosive Properties | Non-explosive |
| Self-ignition temperature | >400°C |
| Oxidizing Properties | Non-oxidizing |
| Granulometry | Particle Size: >1 micron |
| Stability in organic solvents and identity of relevant degradation products | Not applicable |
| Dissociation Constant | Not applicable |
| Viscosity | Not applicable |

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10. STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Stable under normal conditions.

10.4 Conditions to avoid

None.

10.5 Incompatible materials

None.

10.6 Hazardous decomposition products

No information available

11. TOXICOLOGICAL INFORMATION

As a mixture the toxicological properties of this product are unknown. The toxicology of the reported ingredients are summarized below.

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Acute toxicity

Oral: Nontoxic – LD₅₀ ORAL RAT > 11,000 mg/kg (green); 9,990 (black)

Inhalation: Nontoxic – LD₅₀ INHAL RAT >5.08 mg/m³ (green); >5.15 mg/m³ (black)

Dermal: No information available.

Corrosivity/Irritation

Respiratory Tract No classification.

Skin Not corrosive/irritating.

Eyes Mildly irritating.

Sensitization

Respiratory Tract No information available.

Skin Ni oxide is currently classified as a dermal sensitizer (R43) according to the 1st ATP to the CLP Regulation. Recent studies evaluating the bio accessibility of a series of Ni compounds in synthetic sweat indicated very low nickel ion release from Ni oxide suggesting very low or no sensitization potency. Early Guinea pig maximization and Beuhler test results show low potential for nickel oxide to act as a dermal sensitizer.

Pre-existing conditions Individuals known to be allergic to nickel should avoid contact with nickel whenever possible to reduce the likelihood of nickel allergic contact dermatitis reactions (skin

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rashes). Repeated contact may result in persistent chronic palmar/hand dermatitis in a smaller number of individuals, despite efforts to reduce or avoid nickel exposure.

Chronic toxicity

Oral: No information available

Inhalation: Exposure related toxicities were noted following 13 weeks and two years of exposure to NiO in both rats and mice in the US NTP chronic rat inhalation study. Adverse effects in rodents were primarily limited to the lung (e.g., increased tissue weight, inflammation, macrophage hyperplasia). The LOAEC from the chronic study in rats was 0.6 mg NiO/m³ or 0.5 mg Ni/m³•

Dermal: No information available.

Mutagenicity / Reproductive toxicity

Not classified for reproductive/developmental toxicity. Not classified for mutagenicity.

Carcinogenicity

Ingestion: No information available. Not classified.

Inhalation: Cat. 1 A; Human epidemiological and animal data suggest that at least some forms of nickel oxide can be carcinogenic to the respiratory tract of humans after inhalation.

Nickel Hydroxide No information currently available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Aquatic Chronic 4. May cause long lasting harmful effects to aquatic life.

12.2 Persistence and degradability

No information available.

12.3 Bio accumulative potential

No information available.

12.4 Mobility in soil

The substance is essentially insoluble in water.

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Other adverse effects

None anticipated.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Recover or recycle if possible. Dispose of contents in accordance with local, state or national legislation.

13.2 Additional Information

No information available.

14. TRANSPORT INFORMATION

| | |
|---|---------------|
| International Maritime Dangerous Goods Code | Not Regulated |
| International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air | Not Regulated |
| U.S. Dept. of Transportation Regulations | Not Regulated |
| Canadian Transportation of Dangerous Goods Act | Not Regulated |
| European Agreement Concerning the International Carriage of Dangerous Goods by Road | Not Regulated |

15. REGULATORY INFORMATION

International Inventories

| Component | TSCA | DSL | NDSL | EINECS | ELINCS |
|--------------|------|-----|------|-----------|--------|
| Nickel Oxide | X | X | - | 215-215-7 | - |

| Component | NLP | PICCS | ENCS | AICS | IECSC | KECL |
|--------------|-----|-------|------|------|-------|------|
| Nickel Oxide | | X | X | X | X | X |

X Listed

E Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P Indicates a commenced PMN substance

R Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S Indicates a substance that is identified in a proposed or final Significant New Use Rule

T Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

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U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

| Component | CAS-No | Weight % | SARA 313 - Threshold Values % |
|--------------|-----------|----------|-------------------------------|
| Nickel oxide | 1313-99-1 | >95 | 0.1 |

SARA 311/312 Hazardous Categorization

Acute Health Hazard Yes

Chronic Health Hazard Yes

Fire Hazard No

Sudden Release of Pressure Hazard No

Reactive Hazard No

Clean Water Act Not applicable

| Component | CWA-Hazardous Substances | CWA – Reportable Quantities | CWA – Toxic Pollutants | CWA – Priority Pollutants |
|--------------|--------------------------|-----------------------------|------------------------|---------------------------|
| Nickel Oxide | - | - | X | - |

Clean Air Act Not applicable

| Component | HAPS Data | Class 1 Ozone Depletors | Class 2 Ozone Depletors |
|--------------|-----------|-------------------------|-------------------------|
| Nickel Oxide | X | | - |

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

Not applicable

California Proposition 65

This product contains the following Proposition 65 chemicals:

| Component | CAS-No | California Prop. 65 | Prop. 65 NSRL | Category |
|--------------|-----------|---------------------|---------------|------------|
| Nickel Oxide | 1313-99-1 | Carcinogen | - | Carcinogen |

State Right-to-Know

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|--------------|---------------|------------|--------------|----------|--------------|
| Nickel Oxide | X | X | X | X | X |

U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant: N

DOT Severe Marine Pollutant: N

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U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade

No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

D2A Very toxic materials

D2B Toxic materials

Hazard statement(s)

| | |
|------|--|
| H317 | May cause an allergic skin reaction. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H350 | May cause cancer. |
| H372 | Causes damage to organs through prolonged or repeated exposure. |
| H413 | May cause long lasting harmful effects to aquatic life. |

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/fume/gas/mist/vapors/spray. |
| P261 | Avoid breathing dust/fumes/gas/mist/vapors/spray. |
| P264 | Wash hands and face thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P272 | Contaminated work clothing should not be allowed out of the workplace. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
| P281 | Use personal protective equipment as required. |
| P284 | Wear respiratory protection. |
| P302 + P352 | IF ON SKIN: Wash with plenty of soap and water. |
| P304 + P340 | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. |
| P308 + P313 | IF exposed or concerned: Get medical advice/attention. |
| P342 + P311 | If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. |
| P314 | Get medical advice/attention if you feel unwell. |
| P321 | See Safety Data Sheet for specific treatment. |
| P363 | Wash contaminated clothing before reuse. |
| P405 | Store locked up. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

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16. OTHER INFORMATION

Safety Data Sheet prepared by:

Laguna Clay Company
14400 Lomas Ave.
City of Industry, CA 91746
1-800-452-4862
1-626-333-7694

Laguna Clay Company believes that the information in this Material Safety Data Sheet is accurate. However, Laguna Clay Company makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

Notes:

- 1 Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 2008.
- 2 Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40/00.

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