

Vale Inco Black Nickel Oxide

**** THIS DATA SHEET IS PREPARED IN COMPLIANCE WITH EU DIRECTIVE 2001/58/EC****
This MSDS includes both Grade A and Grade F Black Nickel Oxide

1. Chemical Composition and Company Identification

NiO		Ni(OH) ₂	
C.A.S. Number	1313-99-1	C.A.S. Number	12054-48-7
EEC Label No	215-215-7	EEC Label No.	235-008-5

Manufactured by:

Seido Chemical Industry Co., Ltd.
2-1-26, Kitahama, Chuo-ku
Osaka, Japan
541-0041

Imported by:

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2. Hazards Identification

Nickel Oxide

T; Toxic. Category 1 carcinogen.

R49 - May cause cancer by inhalation.

R43 - May cause sensitisation by skin contact.

S53 - Avoid exposure, obtain special instructions before use.

S45 - In case of accident or if you feel unwell seek medical attention immediately. (Show label where possible.)

Nickel Hydroxide

Xn; Harmful Category 3 carcinogen.

R20/22 - Harmful by inhalation and if swallowed.

R68 - Possible risk of irreversible effects.

R43 - May cause sensitisation by skin contact.

S22 - Do not breath dust.

S36 - Wear suitable protective clothing.

3. Composition

Ni	Cu	Fe	S	O
76.6%	<0.0005%	0.009%	0.0002%	22.0%

Hazardous Ingredients	Typical Composition
Nickel Oxide	99.5%
Nickel Hydroxide	0.5%

*as Ni inhalable size fraction

4. First Aid Measures

Ingestion

Large quantities of water should be drunk. Seek medical attention.

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Inhalation Remove from exposure. Seek medical attention.

Skin Wash thoroughly with water. For rashes seek medical advice. Show label if possible.

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

Wounds Cleanse thoroughly to remove any nickel oxide particles.

5. Fire Fighting Measures

Non flammable. Extinguish surrounding fires with appropriate methods.

6. Accidental Release Measures

Collect spills by wet sweeping or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Wear appropriate nationally approved respirators if collection and disposal of spills is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits.

7. Handling and Storage

Keep in the container supplied and keep container closed when not in use. Wear suitable protective clothing including gloves. As packed nickel oxide may constitute a manual handling risk.

Nickel oxide is subject to the Control of Major Accident Hazards Directives 82/501EEC, 96/82/EC & 8/433/EC (The Seveso Directive). Local consent needs to be obtained to store quantities in excess of 1 tonne.

8. Exposure Controls / Personal Protection

Hazardous Ingredients	TLV ⁽²⁾ mg/m³ *	MEL ⁽³⁾ mg/m³*
Nickel Oxide	0.2	0.5
Nickel Hydroxide	0.1	0.5

Maintain airborne nickel oxide levels as low as possible.

Do not inhale dust. Ventilation is normally required when handling or using this product to keep airborne nickel oxide below the nationally authorized limits. If ventilation alone cannot control exposure, use respirators nationally approved for the purpose.

Avoid repeated skin and eye contact. Wear goggles or face shield. Wear suitable protective clothing and gloves. Wash skin thoroughly after handling and before eating, drinking or smoking. Launder clothing and gloves as needed.

9. Physical and Chemical Properties

Black odorless powder.

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Ingredient	Mol. Wt.
NiO	74.71
Viscosity	N/A
Melting point	1984 ⁰ C
Boiling point	N/A
Flash Point	N/A
Autoflammability	N/A
Explosive properties	Not explosive
Vapour pressure	N/A
Tap density	2.0 g/cm ^{3 (5)}
Particle size	8 μm ⁽¹⁴⁾
Solubility cold water	N/A
Solubility hot water	N/A
Partition coefficient	N/A
Magnetic properties	Paramagnetic

10. Stability and Reactivity

Stable and non reactive.

11. Toxicological Information

Nickel Oxide

LD50 ORAL RAT > 5000 mg/kg

Inhalation:

Evidence for the association of nickel compound exposures and cancer risk comes mainly from workers in now obsolete nickel refining operations. The studies of nickel workers suggest that respiratory cancer risks are primarily related to exposure to relatively insoluble forms of nickel notably sulphidic and oxidic nickel at concentrations greater than 10mg/m³. Toxic respiratory effects in animals may be caused by reduced particle clearance capacity.

The International Agency for Research on Cancer (IARC) in 1990 and the U.S. Tenth Report on Carcinogens in 2002 concluded there was sufficient evidence that nickel compounds are carcinogenic to humans. The Report of the International Committee on Nickel Carcinogenesis in Man reported that workers who have been primarily exposed to nickel oxide showed some evidence of increased lung cancer.

The European Union Commission in 1991 classified nickel oxide and work involving exposure to dusts, fumes and sprays produced during the roasting and electrorefining of nickel-copper mattes as carcinogenic processes.

ACGIH has re-evaluated the data regarding the carcinogenicity of nickel and nickel compounds and has classified nickel oxide as a confirmed human carcinogen, Class A1.

There is some evidence that the inhalation of nickel oxide has resulted in an increased incidence of malignant lung tumors in rats. Inhalation of nickel oxide at concentrations 50

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times the TLV, produced pneumoconiosis in hamsters. Repeated intratracheal instillation of nickel oxide produced an increased incidence of malignant lung tumors in rats.

Wounds: Nickel oxide has caused tumors at the site of injection in rodents.

Ingestion: The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded there is no evidence that nickel and its inorganic compounds are carcinogenic when ingested. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient.

Preexisting Conditions: Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitized individuals.

Reproductive Toxicity: There is no evidence of mutagenesis. Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of 2.2 mg/Ni/kg/day by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans.

Nickel Hydroxide No information currently available.

12. Ecological Information

The environmental classification has not been decided.

13. Disposal Considerations

Nickel-containing material is normally collected to recover nickel values. Should disposal be deemed necessary, follow local regulations.

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	Apply to nickel powders if they are less than 100 micron in particle size and if they are packaged in quantities greater than 100 pounds.
Canadian Transportation of Dangerous Goods Act	Not regulated.
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Not regulated.

15. Regulatory Information

Nickel oxide is classified as a Category 1 carcinogen "substances or processes known to be carcinogenic to man" by the EU in Directive 67/548/EEC (Classification, Packaging and Labeling Directive) and in the UK in the Chemicals Hazard Information and Packaging for Supply Regulations and as such it requires to be labeled with the following risk and safety phrases.

Nickel Oxide
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Nickel hydroxide is classified as a Category 3 carcinogen, "a substance which causes concern for man owing to the possible carcinogenic effect but in respect of which the available information is not adequate for making a satisfactory assessment", by the EU in Directive 67/548/EEC (Classification, Packaging and Labeling Directive) and in the UK in the Chemicals Hazard Information and Packaging for Supply Regulations and as such it requires to be labeled with the following risk and safety phrases.

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16. Preparation Information

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Product Stewardship (416) 361-7801

MSDS available online at www.valeinco.com
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Note:

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

Footnotes:

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 EH40/05.
3. Describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.