

MATERIAL SAFETY DATA SHEET
MSDS

Vale Inco Black Nickel Oxide

This MSDS covers the family of products identified as Vale Inco Black Nickel Oxide. This includes the following grades:
 Grade A, Grade F.

Product Information

Vale Inco High Purity Black Nickel Oxide

Distributed By:

Vale Inco Limited
 200 Bay Street, Royal Bank Plaza
 Suite 1600, South Tower, P.O. Box 70
 Toronto, Ontario, Canada M5J 2K2

Manufactured by:

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

Chemtrec 24 hr Emergency No. 1-800-424-9300

High Purity Black Nickel Oxide is used in electroplating, alloying, enameling and as an intermediate in the production of other compounds.

Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	Exposure Limit (TLV) ^{1,2} -mg/m ³
Nickel Oxide (NiO)	95-100	1313-99-1	0.2* as Ni
Nickel Hydroxide (Ni(OH) ₂)	<5	12054-48-7	1 as Ni

Physical Data

Black, odourless powder 99% of which typically passes through a 325 mesh sieve.

Ingredient	Mol. Wt.	Specific Gravity	Melting Point (°C)	Solubility in H ₂ O g/100ml
NiO	74.71	6.67	1990	0
Ni(OH) ₂	92.70	4.15	230	0.013

Fire or Explosion Hazard

Not available.

Reactivity Data

Not applicable.

Toxicological Properties

Nickel Oxide

Oral LD₅₀-rat >5000 mg/kg

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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) (ref. 4) in 1990 and the U.S. Tenth Report on Carcinogens (ref. 5) 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 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.

Preventative Measures

Do not inhale powder. Keep container closed when not in use. Ventilation is normally required when handling or using this product to keep exposure to airborne nickel oxide below the exposure limit. If ventilation alone cannot so control

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exposure, use NIOSH-approved respirators selected according to the current edition of the Selection, Care and Use of Respirators CSA Z94.4. Maintain the airborne nickel levels as low as possible.

If spilled, collect spills by wet sweeping or by vacuuming and pass the vacuum exhaust through a high efficiency particulate arresting (HEPA) filter if the exhaust is discharged into the workplace. Wear appropriate NIOSH-approved respirators if collection and disposal of spills is likely to cause the concentration of airborne contaminants to exceed the exposure limits.

Nickel-containing waste is normally collected to recover nickel values. Should waste disposal be deemed necessary, follow the relevant governmental regulations.

First Aid Measures

For inhalation irritation, move to fresh air and seek medical attention. For skin irritation, wash skin thoroughly with plenty of water; seek medical attention. For eye contact, immediately flush eyeballs with plenty of water; seek medical attention. Cleanse wounds thoroughly to remove any particles.

Preparation Information

Prepared by: Vale Inco Limited
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Suite 1600, South Tower, PO Box 70
Toronto, Ontario, Canada, M5J 2K2

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 Value of the American Conference of Governmental Industrial Hygienists.
- 2 Exposure Limits for user operations will depend on the relevant governmental regulations.
- 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.