

This MSDS includes both Grade A and Grade F Black Nickel Oxide

Hazardous Ingredients

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

*as inhalable fraction

Physical and Chemical Data

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

Ingredient	Mol. Wt.	Specific Gravity	m.p.°C	Sol. In H ₂ O g/100ml
NiO	74.71	6.67	~1990	0
Ni (OH) ₂	92.70	4.15	230	0.013

Physical Hazards

None.

Health Hazards

Nickel Oxide

LD₅₀

ORAL RAT > 5000 mg/kg

Inhalation:

Evidence for the association of nickel compound exposures and cancer risk comes mainly from workers now in 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 electro refining 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 tumours 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 tumours in rats.

Wounds: Nickel oxide has caused tumours 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.

Pre-existing Conditions: Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitised 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.

Precautions for Safe Storage, Handling and Use

Do not inhale. Keep container closed when not in use. Ventilation is normally required when handling or using this product to keep exposure to airborne nickel below the exposure limit. If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to OSHA 29 CFR 1910.134. Maintain the airborne concentration of nickel oxide as low as possible.

Spill, Leak and Disposal Procedure

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 EPA and local regulations.

Emergency and First Aid Procedures

Cleanse wounds thoroughly to remove any particles.

SARA Section 313 Supplier Notification

This product contains the following chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

Nickel Oxide

MATERIAL SAFETY DATA SHEET

MSDS

Nickel Hydroxide

Refer to the Hazardous Ingredients section of this MSDS for the appropriate CAS numbers and the percent by weight.

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Preparation Information

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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 OSHA Permissible Exposure Limit.
- 2 Threshold Limit Value of the American Conference of Governmental Industrial Hygienists.
- 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.