

## Japanese Nickel Oxide Sinter 75

### Hazardous Ingredients

Hazardous Ingredients	Composition	CAS.No	Exposure Limit (PEL <sup>1,3</sup> ) mg/m <sup>3</sup>	Exposure Limit (TLV <sup>2,3</sup> ) mg/m <sup>3</sup>
Nickel Oxide (NiO)	98	1313-99-1	1 as Ni	0.2 * as Ni
Cobaltous Oxide (CoO)	1.5	1307-96-6	0.1 as Co	0.02 as Co

\*as inhalable fraction

Typical Analysis:

Ni	Co	Cu	Fe	S
76.5%	1.2%	0.1%	0.5%	0.002%

### Physical Data

Dark grey, odourless granules approximately 10~100 mesh in size.

Ingredient	Molar Wt	Specific Gravity	Melting Point (C)	Boiling Point (C)
NiO	74.7	6.96	1998	3075

### Fire or Explosion Hazard

None.

### Health Hazards

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

#### **Nickel Oxide**

##### *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/m<sup>3</sup>. 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 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 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.

*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.

### **Cobaltous Oxide (CoO)**

LD50 ORAL RAT: 202 mg/kg

*Inhalation:* Causes irritation to the respiratory tract, symptoms may include coughing, shortness of breath, and nausea. Respiratory hypersensitivity, asthma may appear. Inhalation of cobalt dust and fumes is associated with an increased incidence of lung disease.

*Ingestion* Causes abdominal pain, nausea, vomiting, flushing of the face and ears, mild hypotension, rash, and ringing in the ears. May have cumulative toxic action where elimination cannot keep pace with absorption. Large amounts depress erythrocyte production.

*Skin Contact:* May cause dermatitis. Cause irritation to skin. Symptoms include redness, itching, and pain.

*Eye Contact:* Causes irritation, redness, and pain.

*Chronic Exposure:* Repeated oral administration may produce goiter and reduced thyroid activity. Prolonged or repeated skin exposure may cause dermatitis. Chronic exposure associated with kidney, heart and lung damage.

*Pre-existing Conditions:* Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance. Persons with allergies or sensitivity to cobalt may also be more susceptible to the effects of the substance.

### Precautions for Safe Storage, Handling and Use

Do not inhale dust. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limits. If ventilation alone cannot so control exposure, use approved respirators selected according to the relevant regulatory authority or a relevant standard. Maintain airborne nickel levels as low as possible.

Avoid repeated skin contact. Wear suitable gloves. Wash skin thoroughly after handling. Launder clothing and gloves as needed. Do not store near acids or reactive substances. Like other metals, nickel can react with acids to liberate hydrogen gas which can form explosive mixtures in air. Like other metal powders, nickel powder can react explosively or incandescently with substances such as ammonium nitrate, per chlorates, phosphorous, selenium, sulfur, etc.

Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, Ni(CO)<sub>4</sub>, a toxic gas.

### Spill, Leak and Disposal Procedure

Collect spills by wet sweeping or by vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if the exhaust is discharged into the workplace.

Wear appropriate approved respirators if collection and disposal of spills is likely to cause the concentration of airborne contaminants to exceed the exposure limits.

Metal-containing waste is normally collected to recover metal values. Should waste disposal be deemed necessary follow local regulations.

### Emergency and First Aid Procedures

If exposure to nickel carbonyl is suspected, seek medical attention immediately. For skin rashes, seek medical attention. 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**  
**Cobaltous Oxide**

Refer to the Hazardous Ingredients section of this MSDS for the appropriate CAS numbers and the percent by weight. This product contains the following chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community.

*Distributed By:*

Vale Inco America Inc.  
Park 80 West, Plaza Two  
Saddle Brook, NJ 07663  
Chemtrec 24 hr Emergency No. 1-800-424-9300

*Produced By:*

Vale Inco Japan Limited  
Atago Green Hills,  
MORI Tower 25F  
5-1 Atago 2-chome, Minatoku,  
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MATERIAL SAFETY DATA SHEET

# MSDS

## Preparation Information

Prepared by: Vale Inco Limited  
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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. Exposure Limits for user operations will depend on the relevant governmental regulations.