

MATERIAL SAFETY DATA SHEET  
**MSDS**

## Canadian Nickel Oxide Sinter 75

### Product Information

Canadian Nickel Oxide Sinter 75

Nickel Oxide Sinter 75 is used in the production of stainless and alloy steels.

*Manufactured by:*  
Vale Inco Limited  
Ontario Operations  
Sudbury, ON  
Canada, P0M 1N0

*Distributed by:*  
Vale Inco Limited  
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msds@valeinco.com

*Imported by:*

In North & South America:

Vale Inco of America Inc.  
Park 80 West, Plaza Two  
Saddle Brook, NJ 07663  
USA

In Europe, Middle East, Africa,  
India, & Pakistan:

Vale Inco Europe Limited  
1st Floor, Gordon House,  
10, Greencoat Place  
London SW1P 1PH  
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In Japan:

Vale Inco Japan Limited  
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MORI Tower 25F  
5-1 Atago 2-chome, Minatoku,  
Tokyo 105-6225, Japan

In China

Vale Inco China  
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99 Fu Cheng Road  
Pudong, Shanghai  
200120  
P.R. China

In Asia (Except China, Japan, India, & Pakistan), Australia, and  
New Zealand:

Vale Inco Pacific Limited  
15/F., Wilson House, 19-27 Wyndham Street,  
Central, Hong Kong

### Hazards Identification

**GHS:**

Health	Environmental	Physical
Skin Sensitization – Category 1	Aquatic Toxicity – Chronic 4	-----
Carcinogenicity – Category 1A	-----	-----
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Symbols: Exclamation mark, Health Hazard



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# MSDS

<i>Inhalation</i>	Remove from exposure. Seek medical attention.
<i>Skin</i>	Wash thoroughly with water. For rashes seek medical advice. Show label if possible
<i>Eyes</i>	Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention.
<i>Wounds</i>	Cleanse thoroughly to remove any nickel oxide particles.

### Fire Fighting Measures

*Suitable extinguishing media:* Any, type to be selected according to materials stored in the immediate neighborhood.

*Special risks:* Non flammable. Extinguish surrounding fires with appropriate methods.

*Special protective equipment for fire fighting:* None needed. Wear protective equipment if required for other materials within the immediate vicinity.

### Accidental Release Measures

*Person related precautionary measures:* 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.

*Environmental Protection measures:* No specific measures needed.

*Procedures for cleaning/absorption:* 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. Replace in original container. Nickel-containing material is normally collected to recover nickel values.

### Handling and Storage

*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. As packed, nickel oxide may constitute a manual handling risk.

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

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Exposure Controls / Personal Protection

Nickel Oxide (NiO) – CAS 1313-99-1		
	Exposure Limit (mg/m3)	Year
ACGIH TLV-TWA <sup>(1)</sup>	0.2 * ‡ as Ni	2008
UK WEL <sup>(2)</sup>	0.5 as Ni	2006
Japan	1 as Ni	1968
Korea	0.1 as Ni	2006
China	1 as Ni	2007

\* Inhalable fraction

‡ Insoluble inorganic fraction

Cobaltous Oxide (CoO) – CAS 1307-96-6		
	Exposure Limit (mg/m3)	Year
ACGIH TLV-TWA <sup>(1)</sup>	0.02 as Co	2008
UK WEL <sup>(2)</sup>	0.1 as Co	2006
Japan	0.05 as Co	1968
Korea	n.av.	2006
China	0.05 as Co	2007

*Occupational exposure controls:*

- a. Respiratory protection:* 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.
- b. Eye protection:* Avoid repeated eye contact. Wear goggles or face shield.
- c. Hand & Skin Protection:* Avoid repeated skin contact. 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.

Physical and Chemical Properties

Black odourless powder.

Ingredient	Mol. Wt.
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NiO	74.71
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pH	Not Applicable (N/A)
Boiling point/ boiling range	3075°C
Freezing point / freezing range	1998°C
Flash Point	N/A
Evaporation rate	N/A
Flammability	N/A
Explosive properties	Not explosive
Vapour pressure	N/A
Vapour density	N/A
Relative density	2.9 - 3.3 g/cm <sup>3</sup>
Solubility cold water	N/A
Solubility hot water	N/A
Partition coefficient	N/A
Auto-ignition temperature	N/A
Decomposition temperature	N/A
Oxidizing properties	Not oxidizing
Viscosity	N/A
Particle size	98% > 0.15mm

### Stability and Reactivity

*Conditions to be avoided:* No hazardous exothermic reaction.

*Substances to be avoided:* None.

*Hazardous decomposition products:* No information available.

### Toxicological Information

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.

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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)**

LD<sub>50</sub> 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.

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### Ecological Information

*Biologic degradation:*

*Ecotoxic effects:*

*Biological data:*

Aquatic Toxicity – Chronic category 4  
 Fish toxicity Br. rerio LC<sub>50</sub>>100mg/1/96h;  
 Daphnia Toxicity: Daphnia magna EC<sub>50</sub>>100mg/1/48h;  
 Algal Toxicity: Selenastrum capricornatum IC<sub>50</sub>: >127.3 mg/1/72 (suspension);  
 Bacterial toxicity: Pseudomonas fluorescens EC<sub>50</sub>: 250mg/1/48h

*Further Ecological Data:*

Due to poor solubility of the product, no harmful effects on aquatic organisms are to be expected when handled and used with due care and attention.

### Disposal Considerations

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

### Transport Information

<b>International Maritime Dangerous Goods Code</b>	Not regulated.
<b>International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air</b>	Not regulated.
<b>U.S. Dept. of Transportation Regulations</b>	Not regulated.
<b>Canadian Transportation of Dangerous Goods Act</b>	Not regulated.
<b>European Agreement Concerning the International Carriage of Dangerous Goods by Road</b>	Not regulated.

### Regulatory Information

### Other Information

**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.

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**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 EH40/00.*