

Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	Exposure Limit (PEL) <sup>1</sup> –mg/m <sup>3</sup>	Exposure Limit (TLV) <sup>2</sup> –mg/m <sup>3</sup>
Nickel (Ni)*	99.1	7440-02-0	1	1.5*

\*as inhalable fraction

Physical and Chemical Data

A Grey, odourless, powder with an average particle size of 2 to 2.8 microns.

Ingredient	Mol. Wt.	Specific Gravity	Melting Point (°C)	Boiling Point (°C)	Solubility in H <sub>2</sub> O (g/100ml)
Ni	58.71	8.9	1453	2732	0

Bulk Density

0.35 to 0.50 g/m<sup>3</sup>

Physical Hazards

Metal powders heat treated in reducing atmospheres may become spontaneously combustible.

Health Hazards

**Nickel**

Acute Toxicity:

- a) Oral: Non toxic - LD<sub>50</sub> ORAL RAT >9000 mg/kg
- b) Inhalation: No information available
- c) Dermal: No information available.

Corrosivity/Irritation:

- a) Respiratory Tract: None
- b) Skin: See sensitization section.
- c) Eyes: Mechanical irritation may be expected.

Sensitization:

- a) Respiratory tract: Nickel metal induced asthma is very rare. 3 case reports are available; the data is not sufficient to conclude that nickel metal is classified as a respiratory sensitizer.
- b) Skin: Nickel metal is a well-known skin sensitizer. Direct and prolonged skin contact with metallic nickel may induce nickel allergy and elicit nickel allergic skin reactions in those people already sensitized to nickel, so called nickel allergic contact dermatitis.
- c) Pre-existing conditions: Individuals known to be allergic to nickel should avoid contact with nickel whenever possible to reduce the likelihood of nickel allergic contact dermatitis reactions (skin rashes). Repeated contact may result in persistent chronic palmar/hand dermatitis in a smaller number of individuals, despite efforts to reduce or avoid nickel exposure.

## MATERIAL SAFETY DATA SHEET

**MSDS**

## Chronic toxicity:

## a) Oral:

No information available

## b) Inhalation:

Animal studies (rats) show that repeated dose inhalation of nickel damages the lung. Chronic inflammation, lung fibrosis and accumulation of nickel particles were observed. Direct and prolonged skin contact with nickel metal may cause nickel sensitization resulting in nickel allergic contact dermatitis /skin rash.

## c) Dermal:

## Mutagenicity /

## Reproductive toxicity:

No data.

## Carcinogenicity:

## a) Ingestion:

The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded that there is no evidence that nickel metal is carcinogenic when ingested.

## b) Inhalation:

There is limited information available from inhalation and intratracheal studies in animals. The U.S. National Toxicology Program has listed metallic nickel as reasonably anticipated to be a human carcinogen. To date, there is no evidence that nickel metal causes cancer in humans based on epidemiology data from workers in the nickel producing and nickel consuming industries.

The International Agency for Research on Cancer (IARC)(Vol 49) found there was inadequate evidence that metallic nickel is carcinogenic to humans but since there was sufficient evidence that it is carcinogenic to animals, IARC concluded that metallic nickel is possibly carcinogenic to humans (Group 2B). In 1997, the ACGIH categorized elemental nickel as: A5 "Not Suspected as a Human Carcinogen". Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard

Precautions for safe storage, handling and use

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 below the exposure limit. If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to OSHA 29 CFR 1910.134. 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, perchlorates, phosphorous, selenium, sulphur, 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.

## MATERIAL SAFETY DATA SHEET

**MSDS**

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

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**

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

Vale Inco America's Inc.  
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Chemtrec 24 hr Emergency No. 1-800-424-9300

### 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. 2008
- 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.