

MATERIAL SAFETY DATA SHEET  
**MSDS**

## Ferronickel Pellet

### Product Information

Ferronickel Pellet is used in the production of alloy steels.

Vale Inco Limited  
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Chemtrec 24 hr Emergency No. 1-800-424-9300

WHMIS Classification: D2A, D2B

### Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	Oral LD <sub>50</sub> -rat	Exposure Limit (TLV) <sup>1,2</sup> -mg/m <sup>3</sup>
Ferronickel (Fe <sub>1.87</sub> Ni)	100	11110-39-7	>5000 mg/kg	None (1.5 for elemental Ni)

### Physical Data

Silver-grey, odourless pellets.

Ingredient	Mol. wt.	Specific Gravity	Melting Point (°C)	Boiling Point (°C)
Ferronickel	163.08	8.2	~1500	~2900

### Fire or Explosion Hazard

Not applicable.

### Reactivity Data

Like other metal alloys, ferronickel can react with acids to liberate hydrogen gas, which can form explosive mixtures in air.

Under special conditions ferronickel metal can react with carbon monoxide in reducing atmospheres to form iron carbonyl, Fe(CO)<sub>5</sub>, and nickel carbonyl, Ni(CO)<sub>4</sub>, a toxic gas.

### Toxicological Properties

#### **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 |
|-----------------------|------|

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- 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.

**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.
- c) *Dermal:* Direct and prolonged skin contact with nickel metal may cause nickel sensitization resulting in nickel allergic contact dermatitis /skin rash.

**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

**Iron:  
LD<sub>50</sub>**

30 gm/kg

Prolonged eye contact with the metal dust could cause rust-brown coloured spots forming around the particles and if left for several years, permanent damage could result.

## Preventive Measures

If user operations generate dust, use ventilation to keep exposure below the exposure limit for nickel. If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to the Selection, Care and Use of Respirators CSA Z94.4 current edition. 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.

If spilled, collect 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 NIOSH-approved respirator if collection and disposal of spills is likely to cause the concentration of airborne ferronickel to exceed exposure limits.

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

## First Aid Measures

If exposure to nickel carbonyl or iron carbonyl is suspected, seek medical attention immediately.

For skin rashes seek medical attention.

Cleanse wounds thoroughly to remove any ferronickel particles.

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