

Ferronickel Pellet

Hazardous Ingredients

Information on Ingredients:

| Hazardous Ingredients | Composition (%) | C.A.S. No. | Exposure Limit (PEL) ¹ -mg/m ³ | Exposure Limit (TLV) ² - mg/m ³ |
|-----------------------|-----------------|------------|--|---|
| Iron | 50 - 60 | 7439-89-6 | Not available | Not available |
| Nickel | 40 - 50 | 7440-02-0 | 1 | 1.5 as metallic Ni* |

* - Inhalable fraction

| Hazardous Ingredients | Typical Composition |
|-----------------------|---------------------|
| Ferronickel | 100% |

Physical and Chemical Data

Silver-grey, odourless pellets.

| Ingredient | Mol. Wt. | Specific Gravity | Melting Point (°C) | Boiling Point (°C) |
|-------------|----------|------------------|--------------------|--------------------|
| Iron (Fe) | 55.85 | 7.8 | 1535 | 2730 |
| Nickel (Ni) | 58.71 | 8.9 | 1453 | 2732 |

Physical Hazards

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)₅, and nickel carbonyl, Ni(CO)₄, a toxic gas.

Health Hazards

Nickel

Acute Toxicity:

- a) *Oral*: Non toxic - LD₅₀ 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:

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- 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:

LD₅₀ 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.

Precautions for safe storage, handling and use

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 OSHA 29 CFR 1910.134. Maintain airborne nickel levels as low as possible. Maintain airborne nickel levels as low as possible.

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Avoid repeated skin contact. Wear suitable gloves. Wash skin thoroughly after handling. Launder clothing and gloves as needed.

Do not store near acids.

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 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

| | |
|--------------------|---|
| <i>Ingestion:</i> | Seek medical attention. |
| <i>Inhalation:</i> | Supply fresh air. Seek medical attention. |
| <i>Skin:</i> | Wash thoroughly with water. For rashes seek medical advice. Show label or data sheet if possible. |
| <i>Eyes:</i> | Irrigate eyeball thoroughly with water for at least 10 minutes. Seek medical attention. |
| <i>Wounds:</i> | Cleanse thoroughly to remove any nickel 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.

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Chemtrec 24 hr Emergency No. 1-800-424-9300

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.