

Vale Inco F-Nickel Shot

Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	Exposure Limit (PEL) ¹ –mg/m ³	Exposure Limit (TLV) ² –mg/m ³
Nickel (Ni)	92	7440-02-0	1	1.5*
Silicon (Si)	5	7440-21-3	10 (total dust) 5 (respirable)	10 (total dust)

* As inhalable fraction

The remaining ingredient is iron metal (3%), which does not meet the criteria of a hazardous material. All three ingredients: nickel metal, iron metal, and silicon are U.S. EPA TSCA registered chemicals.

Physical and Chemical Data

Silver-grey, odorless metal in spheres of approximately -1/4 in. to +30 mesh (-6.4 mm to +.48 mm).

Ingredient	Mol. Wt.	Specific Gravity	Melting Point (°C)	Boiling Point (°C)	Solubility in H ₂ O g/100ml
Ni	58.71	8.9	1453	2732	0
Si	28.086	2.33	1410	2355	0

Physical Hazards

Material can create slippery conditions if spilled.

Health Hazards³

Nickel

Acute Toxicity:

- a) Oral: Non toxic - LD₅₀ ORAL RAT >9000 mg/kg
- b) Inhalation: One case has been reported of a fatality following extreme exposure at an estimated 382 mg Ni/m³. A plasma spraying operative died of pneumonia 13 days after exposure to nickel powder particles. The post mortem diagnosis was shock lung.
- 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.

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c) *Preexisting 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.

Repeated dose 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

Silicon Silicon is defined by the American Conference of Governmental Industrial Hygienists as a nuisance particulate.

Precautions for safe storage, handling and use

If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne nickel below the PEL. 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. Like other metals, nickel can react with acids to liberate hydrogen gas which can form explosive mixtures in air.

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

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Silicon can react under certain conditions with metal acetylides, metal carbonates, metal hexafluorides, oxidants and calcium.

Spill, leak and disposal procedure

Pick up product and replace in original container. 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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Product Stewardship (416) 361-7801

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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 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.