

Vale Inco Electrolytic Nickel

Hazardous Ingredients

Electrolytic Nickel includes FSC (Full Size Cathode), Strip, 1X1, and 4X4

Hazardous Ingredients	Calculated Composition	C.A.S. No	PEL ¹ –mg/m ³	TLV ² –mg/m ³
Nickel (Ni)	99.92	7440-02-0	1	1.5*

*as inhalable fraction

Physical and Chemical Data

Silver-grey, odorless metal squares, strips or slabs of various sizes.

Ingredient	Mol. Wt.	Specific Gravity	Melting Point (°C)	Boiling Point (°C)	Solubility in H2O g/100ml
Nickel	58.71	8.9	1453	2732	0

Physical Hazards

Material has sharp edges which can cause cuts and lacerations.

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.
- 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

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 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. 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.

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 nickel particles.

Vale Inco China
Room 2501 Aurora Place
99 Fu Cheng Road
Pudong, Shanghai
200120
China

Preparation Information

MSDS Prepared by: Vale Inco Limited
200 Bay St., Royal Bank Plaza
Suite 1600, South Tower, PO Box 70
Toronto, Ontario, Canada, M5J 2K2

Product Stewardship (416) 361-7801

MSDS available online at www.valeinco.com
msds@valeinco.com

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.