

MATERIAL SAFETY DATA SHEET
MSDS

Nickel

Product Information

Nickel; massive forms

Synonyms (# - Manufacturing location):

Vale Inco FSC ¹	ValeInco Strip ¹	Vale Inco Pellets ^{2,3}	Vale Inco Flats ^{2,3}
Vale Inco 1X1 ¹	Vale Inco 4X4 ¹	Vale Inco S-Pellets ³	Vale Inco Chips ^{2,3}
Vale Inco OSC ¹	Vale Inco R-Rounds ¹	Vale Inco P-Pellets ^{2,3}	Vale Inco Foam ^{4,5}
Vale Inco S-Rounds ¹	Vale Inco Discs ^{2,3}	Vale Inco Plating Chips ^{2,3}	

Vale Inco Nickel is used in the electroplating, and alloying applications.
Vale Inco Nickel foam is used to manufacture battery electrodes

Manufactured by:

In Canada:

1. Vale Inco Ltd.
Manitoba Operations
Thompson, MB
Canada R8N 1P3
2. Vale Inco Limited
Ontario Operations
Sudbury, ON
Canada P0M 1N0

In the UK:

3. Vale Inco Europe Limited
Clydach Refinery
Clydach Swansea
UK
SA6 5QR

In China:

4. IATM Shenyang
Inco Advanced Technology Materials (ShenYang)
Co., Ltd
NO.8 Shi Ji Road, Hun Nan New Zone,
Shenyang, Liao Ning Province, P.R. China
110179
5. IATM Dalian
Inco Advanced Technology Materials (Dalian) Co., Ltd
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Dalian, Liao Ning Province, P.R. China
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MATERIAL SAFETY DATA SHEET
MSDS

Imported by:

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 USA

In Europe, Middle East, Africa,
 India, & Pakistan:

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 1st Floor, Gordon House,
 10, Greencoat Place
 London SW1P 1PH
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In Japan:

Vale Inco Japan Limited
 Atago Green Hills,
 MORI Tower 25F
 5-1 Atago 2-chome, Minatoku,
 Tokyo 105-6225, Japan

In China

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

In Asia (Except China, Japan, India, & Pakistan), Australia, and New Zealand:

Vale Inco Pacific Limited
 15/F., Wilson House, 19-27 Wyndham Street,
 Central, Hong Kong

Hazards Identification

GHS:

Health	Environmental	Physical
Skin Sensitization – Category 1	Aquatic Toxicity – Chronic 3	-----
Carcinogenicity – Category 2	-----	-----
STOT * Repeated Exposure – Category 1	-----	-----

* - Single Target Organ Toxicity

Symbols: Exclamation mark, Health Hazard



Signal Word: Danger

Hazard Statements:

- May cause an allergic skin reaction.
- Causes damage to lungs through prolonged or repeated inhalation exposure
- Suspected of causing cancer
- Harmful to aquatic life with long lasting effects

Precautionary Statements:

Prevention:

Avoid breathing dust or fume.

MSDS

Contaminated work clothing should not be allowed out of the workplace.
 Wear protective gloves and protective clothing
 Wash hands, and face thoroughly after handling.
 Do not eat, drink or smoke when using this product.

Response:

If on skin: Wash with plenty of soap and water.
 If skin irritation or rash occurs: Get medical advice/attention.
 Get medical advice/attention if you feel unwell.

Disposal:

Dispose of contents/container in accordance to local/regional/national/international regulations

Composition

Substance

Mixture

Hazardous Ingredients	Typical Composition	C.A.S. Number	EINECS/ EC Label No.
Nickel Metal (Ni)	100%	7440-02-0	231-111-4

First Aid Measures

Ingestion: No specific first aid required.
Inhalation: No specific first aid required.
Skin: Wash thoroughly with water. For rashes seek medical advice. Show label if possible.
Eyes: Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention.
Wounds: Cleanse thoroughly to remove any nickel particles.

Fire Fighting Measures

Suitable extinguishing media: Any, type to be selected according to materials stored in the immediate neighborhood.
Special risks: Non-flammable. May oxidize to Nickel Oxide if exposed to high temperatures within a fire. Keep containers cool with water spray.
Special protective equipment for fire fighting: None needed. Wear protective equipment if required for other materials within the immediate vicinity.

Accidental Release Measures

Person related precautionary measures: Avoid generation of dusty atmospheres. Do not inhale dusts.

MATERIAL SAFETY DATA SHEET
MSDS

Environmental Protection measures:

No specific measures needed.

Procedures for cleaning/absorption:

Pick up and replace in original container. Nickel-containing material is normally collected to recover nickel values.

Handling and Storage

Handling:

Prevent the generation of inhalable dusts e.g. by the use of suitable ventilation. Do not inhale dust. Wear appropriate nationally approved respirators if handling is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits. Wear suitable protective clothing and gloves. As packed nickel may constitute a manual handling risk.

Storage:

Keep in the container supplied, and keep container closed when not in use. Local regulations should be followed regarding the storage of this product.

Exposure Controls / Personal Protection

Nickel Metal (Ni) – CAS 7440-02-0		
	Exposure Limit (mg/m3)	Year
ACGIH TLV-TWA	1.5 *	2008
UK WEL	0.5	2006
Japan	1	1968
Korea	1	2006
China	1	2007

* - as Ni in inhalable fraction

Maintain airborne nickel levels as low as possible.

Occupational exposure controls:

a. Respiratory protection:

As supplied this product does not pose a health hazard due to inhalation. Ventilation may be required if user operations change it to other physical or chemical forms, whether as end products, intermediates or fugitive emissions, which are inhalable.

b. Eye protection:

None

c. Hand & Skin Protection:

Avoid repeated skin contact. Wear suitable protective clothing and gloves, which should be selected specifically for the working place, depending on concentration and quantity of the hazardous material (overalls and leather/rubber gloves). Wash skin thoroughly after handling and before eating, drinking or smoking. Change contaminated clothing

frequently. Launder clothing and gloves as needed. Use of skin-protective barrier cream advised.

Physical and Chemical Properties

Silver-grey odourless metallic.

Ingredient	Mol. Wt.
Nickel	58.71

pH	Not Applicable (N/A)
Boiling point/ boiling range	2732°C
Freezing point / freezing range	1453°C
Flash Point	N/A
Evaporation rate	N/A
Flammability	N/A
Explosive properties	Not explosive
Vapour pressure	N/A
Vapour density	N/A
Relative density	8.9 g/cm ³
Solubility cold water	Insoluble
Solubility hot water	Insoluble
Partition coefficient	N/A
Auto-ignition temperature	N/A
Decomposition temperature	N/A
Oxidizing properties	Not oxidizing
Viscosity	N/A
Packaged Density	Pellets: 5.4 – 6.0 g/cm ³ Discs: 5.4 – 6.0 g/cm ³ Flats: 4.5 – 6.0 g/cm ³ Chips: 4.5 – 6.0 g/cm ³ Foam: 200-5000g/m ³

MATERIAL SAFETY DATA SHEET
MSDS

Particle size	1X1: 25 X 25mm Strip: 100 X 600mm, 150 X 600mm, 150 X 900mm, 200 X 600mm, 4X4: 100 X 100mm Rounds: 18-24mm diameter FSC: 720 x 1030mm. Pellets: 6-14 mm diameter Discs: 2-20mm diameter Flats: 2-3mm thick, 15-20mm diameter Chips: 4-8mm thick >15mm diameter Foam: 1.5 – 5mm thick <1m wide
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Stability and Reactivity

Conditions to be avoided: No hazardous exothermic reaction.
 This product can react vigorously with acids to liberate hydrogen, which can form explosive mixtures with air. Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, Ni(CO)₄, a toxic gas. Metal powders when heated in reducing atmospheres may become pyrophoric.

Substances to be avoided: None.

Hazardous decomposition products: No information available.

Toxicological Information³

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:

MATERIAL SAFETY DATA SHEET
MSDS

- 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.

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.

Ecological Information

This material is not readily degradable.

MATERIAL SAFETY DATA SHEET
MSDS

Disposal Considerations

Nickel-containing material is normally collected to recover nickel values. Should disposal be deemed necessary, follow local regulations.

Transport Information

International Maritime Dangerous Goods Code	Not regulated.
International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air	Not regulated.
U.S. Dept. of Transportation Regulations	Not regulated.
Canadian Transportation of Dangerous Goods Act	Not regulated.
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Not regulated.

Regulatory Information

Other Information

As supplied this product cannot be inhaled. User operations may generate inhalable dusts. If user operations change the substance to other chemical forms, whether as end products, intermediates or fugitive emissions, the user must determine the possible health hazards of such forms.

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.

1. Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 2008.
2. Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40/00.
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.

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