

Nickel Pellets

** THIS DATA SHEET IS PREPARED IN COMPLIANCE WITH EU DIRECTIVE 2001/58/EC**

1. Substance and Company Identification

Vale Inco Nickel Pellets, Nickel Melting is used in nickel alloys and stainless steel manufacturing.

C.A.S. Number 7440-02

EINECS Number 231-111-4

Vale Inco Europe Ltd.
1st Floor, Gordon House
10 Greencoat Place
London, UK SW1 1PH

24 hr Emergency Tel: +44(0)1792-842501

Fax: +44(0)1792-841357

2. Hazards Identification

Xn – Harmful - Category 3 Carcinogen

R40 - Limited evidence of a carcinogenic effect.

R43 - May cause sensitisation skin contact.

As supplied this product does not pose a health hazard due to inhalation. User operations may generate inhalable dusts. If user operations change the substance to other physical or chemical forms, whether as end products, intermediates or fugitive emissions, the user must determine the health hazards of such forms.

3. Composition

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

4. First Aid Measures

| | |
|--------------------|--|
| <i>Ingestion:</i> | Seek medical attention. |
| <i>Inhalation:</i> | 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. If discomfort persists seek medical attention. |
| <i>Wounds:</i> | Cleanse thoroughly to remove any nickel particles. |

5. Fire Fighting Measures

Suitable extinguishing media: Any, type to be selected according to material in the immediate neighbourhood

Special protective equipment for fire fighting: None needed. Wear protective equipment if required for other materials within the immediate vicinity

MATERIAL SAFETY DATA SHEET
MSDS

6. Accidental Release Measures

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

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.

7. Handling and Storage

Handling: Prevent the generation of inhalable dusts e.g. by the use of suitable ventilation. Do not inhale dusts. 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 product may constitute a manual handling risk.

Storage: Keep in the container supplied, and keep the container closed when not in use. Containers should be stored under cover in a clean and dry environment.

8. Exposure Controls/Personal Protection

| | TLV ¹³ (mg/m3) | WEL ²³ (mg/m3) |
|--------|---------------------------|---------------------------|
| Nickel | 1.5 * | 0.5 |

* - inhalable particle size 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 and skin protection:* Avoid skin contact. Wear suitable protective clothing and gloves, which should be selected specifically for the working place, dependant on the concentration and quantity of the hazardous material being handled. Wash skin thoroughly after handling and before eating, drinking or smoking. Launder clothing and gloves as needed.

9. Physical and Chemical Properties

Silver grey, odourless metallic spheroids.

MATERIAL SAFETY DATA SHEET
MSDS

| | |
|------------------------------|-----------------------------|
| Molecular weight of nickel | 58.71 |
| PH | N/A |
| Boiling Point/ boiling range | 2732 oC |
| Melting Point/ melting range | 1453 oC |
| Flash Point | N/A |
| Auto flammability | N/A |
| Explosive Properties | Not explosive |
| Oxidizing properties | Not oxidizing |
| Vapor pressure | N/A |
| Solubility - cold water | Insoluble |
| Solubility - hot water | Insoluble |
| Partition coefficient | N/A |
| Viscosity | N/A |
| Specific gravity of nickel | 8.9 g/m ³ |
| Packaged density | 5.4 - 6.0 g/cm ³ |
| Size | 2 – 20 mm dia |
| Magnetic properties | Ferromagnetic |

10. Stability and Reactivity

Conditions to be avoided: None.

Substances to be avoided: This product can react vigorously with acids to liberate hydrogen, which can form explosive mixtures with air.

Hazardous decomposition products: None

11. Toxicological Information⁴

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:

- 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.

MATERIAL SAFETY DATA SHEET
MSDS

- 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

12. Ecological Information

This material is not readily degradable and is not classified as dangerous or harmful to the environment.

13. Disposal Considerations

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

14. Transport Information

MATERIAL SAFETY DATA SHEET
MSDS

| | |
|---|----------------|
| 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. |

15. Regulatory Information

Nickel metal is classified as a Category 3 carcinogen "a substance which causes concern for man owing to the possible carcinogenic effect but in respect of which the available information is not adequate for making a satisfactory assessment", by the EU in Directive 67/548/EEC (Classification, Packaging and Labeling Directive) and in the UK in the Chemicals Hazard Information and Packaging for Supply Regulations 2002 and as such the following risk and safety phrases are applicable.

Xn - Harmful - Category 3 Carcinogen

- R40 - Limited evidence of a carcinogenic effect.
- R43 - May cause sensitisation by skin contact.
- S22 - Do not breathe dust.
- S36/37 - Wear suitable protective clothing and gloves.

16. Other Information

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. *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. *Exposure Limits for user operations will depend on the relevant governmental regulations.*
4. *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.*