

Electrolytic Nickel

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

1. Substance and Company Identification

Electrolytic Nickel – Plating Grade

Used for electroplating or electroless plating.

Synonyms: Full Size Cathode, Strip, 4x4, 1x1, and OSP

C.A.S. Number 7440-02-0

EINECS Number 231-111-4

Imported by:

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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	99.92 %

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

<i>Suitable extinguishers:</i>	Any, type to be selected according to material in the immediate neighbourhood
<i>Special Risks:</i>	Non-flammable. May oxidize to Nickel Oxide if exposed to high temperatures within a fire. Keep containers cool with water spray.

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

6. Accidental Release Measures

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

Environmental protection measures: No specific measures needed

Cleaning/absorption procedures: 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. Nickel metal is no longer subject to the Control of Major Accident Hazards Directives 82/501 EEC, 96/82/EC & 98/433/EC (The Seveso Directive). Local regulations should be followed regarding the storage of this material.

8. Exposure Controls/Personal Protection

Exposure limit values: Occupational exposure limits expressed as Ni in inhalable particle size fraction:

TLV ¹ (mg/m ³)	WEL ² (mg/m ³)
1.5 *	0.5

* - 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 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. Use of skin protective barrier cream advised.

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9. Physical and Chemical Properties

Silver grey, odourless metallic sheared shapes ~ 15 mm thick.

Molecular weight of nickel	58.71
pH	N/A
Boiling Point/ boiling range	2732 °C
Melting Point/ melting range	1453 °C
Flash Point	N/A
Auto flammability	N/A
Explosive Properties	Not explosive
Oxidising properties	Not oxidising
Vapour 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	
Size	25x25 mm, 100x100 mm, 100x600 mm, 150x600 mm, 150x900 mm, 200x600 mm, 720x1030 mm
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. Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form Nickel Carbonyl, Ni(CO)₄, a toxic gas.

Hazardous decomposition products: None

11. 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:

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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.

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.

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14. 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.

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

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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. 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 EH40/05.
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.