MATERIAL SAFETY DATA SHEET
MSDS

# Vale Inco Nickel Powder Type 110

## Product Information

Vale Inco Nickel Powder Type 110

Nickel Powder Type 110 is used in the production of batteries and electronic equipment and in powder metallurgy applications.

*Manufactured by:*

In Canada:
Vale Inco Limited
Ontario Operations
Copper Cliff, ON
P0M 1N0
Canada

In the U.K.:
Vale Inco Europe Limited
Clydach Refinery,
Clydach, Swansea, Wales, UK
SA6 5QR

*Distributed by:*
Vale Inco Limited
200 Bay St., Royal Bank Plaza
Suite 1600, South Tower, PO Box 70
Toronto, ON
Canada, M5J 2K2
msds@valeinco.com

*Imported by:*

In North & South America:

Vale Inco of America Inc.
Park 80 West, Plaza Two
Saddle Brook, NJ 07663
USA

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

Vale Inco Europe Limited
1st Floor, Gordon House,
10, Greencoat Place
London SW1P 1PH
England

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 2 | ------- |
| Carcinogenicity – Category 2 | ------- | ------- |
| STOT * Repeated Exposure – Category 1 | ------- | ------- |

* - Single Organ Target Toxicity

Symbols: Exclamation mark, Health Hazard, Environment

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
Toxic to aquatic life with long lasting effects

Precautionary Statements:

Prevention:

Avoid breathing dust or fume.
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.
Avoid release to the environment

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.
Collect spillage

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) | >98% | 7440-02-0 | 231-111-4 |

## First Aid Measures

*Ingestion* Seek medical attention.

*Inhalation* Seek medical attention.

*Skin* Wash thoroughly with water. For rashes seek medical advice. Show label or data sheet 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:* Package intact - Any, type to be selected according to materials stored in the immediate neighborhood.
Spilled Powder – Use water mist or fine spray - pressurized extinguishants may disperse the powder and spread the fire.

*Special Risks:* Not classified as flammable for transport purposes. 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.

*Environmental protection measures:* Avoid release to the Environment. Collect spillage

*Procedures for cleaning/*

*absorption:* Collect spills by wet sweeping or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Wear appropriate nationally approved respirators if collection and disposal of spills is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits. 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 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, in dry conditions and keep the container closed when not in use. Containers should be stored under cover in a clean and dry environment. Local regulations should be followed regarding the storage of this material.

## Exposure Controls/Personal Protection

| Nickel Metal (Ni) – CAS 7440-02-0 | | |
|---|---|---|
| | Exposure Limit (mg/m3) | Year |
| ACGIH TLV-TWA [1] | 1.5 * | 2008 |
| UK WEL [2] | 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:* Ventilation is normally required when handling or using this product to keep airborne nickel below the nationally authorized limits. If ventilation alone cannot control exposure, respiratory protection must be used.

*a) Respiratory protection:* Do not inhale dust. If ventilation alone cannot control exposure, respiratory protection (selected specifically for the working place, depending on concentration and quantity of the hazardous material) must be used.

*b) Eye protection:* Avoid contact with eyes. Wear goggles or face shield or approved safety glasses.

*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. Use of skin protective barrier cream advised.

## Physical and Chemical Properties

Silver grey, odourless metallic powder.

| 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/cm3 |
| 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 |
| Particle size (microns) | 0.8 – 1.5 |
| Bulk density (g/cm3) | 0.9 – 2.3 |
| Magnetic properties | Ferromagnetic |

## Stability and Reactivity

*Conditions to be avoided:* Hazardous exothermic reaction improbable. Not classified as flammable.

*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. Metal powders when heated in reducing atmospheres may become pyrophoric.

*Hazardous decomposition products:* None

## Toxicological Information [3]

**Nickel:**

*Acute Toxicity:*

*a) Oral:* Non toxic - $LD_{50}$ 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 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 small 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*: Nickel metal powders may act in the body like soluble nickel compounds. Soluble nickel compounds have been shown to be toxic to reproduction in pregnant female rats causing “stillbirths”. The relevance of the animal data to human exposure is unknown to date. So far no human studies confirm this effect.

*Carcinogencity:*

*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

Classified as Aquatic Chronic category 2 under GHS classification. Toxic to aquatic life with long lasting effects

## 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** | Apply to nickel powders if they are less than 100 micron in particle size and if they are packaged in quantities greater than 100 pounds. |
| **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

***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.

Safety Data Sheet prepared by:

Vale Inco Limited
200 Bay St., Royal Bank Plaza
Suite 1600, South Tower, PO Box 70
Toronto, ON
Canada, M5J 2K2
Product Stewardship (416) 361-7801
msds@valeinco.com

SDS available online at www.valeinco.com