

MATERIAL SAFETY DATA SHEET  
**MSDS**

## TNRC – Utility® Nickel

### Product Information

TNRC – Utility® Nickel

Used in manufacturing of stainless steel

*Manufactured by:*

Taiwan Nickel Refining Corporation  
 40 Hsing Yeh Road  
 Ta-Fa Industrial District  
 Kaohsiung Hsein  
 Taiwan, Republic of China

*Distributed by:*

Vale Inco Limited  
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### 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.
- 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.	EINECS/ EC Label No.
Nickel	97% min	7440-02-0	231-111-4
Cobalt	1.4% max	7440-48-4	231-158-0
Copper	0.90% max	7440-50-8	231-159-6
Iron	0.75% max	7439-89-6	231-096-4
Sulphur	0.14% max	7704-34-9	231-722-6

## 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.

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*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 powder 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

Irregular shapes, silver grey in color.

Ingredient	Mol. Wt.
Nickel	58.71

pH	Not Applicable (N/A)
Boiling point/ boiling range	2730 °C (4946 F)
Freezing point / freezing range	1455 °C (2651 F)
Flash Point	N/A
Evaporation rate	N/A
Flammability	N/A
Explosive properties	Not explosive
Vapour pressure	1mmHg (at 1810 °C)
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	98% 3~80mm

## 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)<sub>4</sub>, 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 Information<sup>3</sup>

**Nickel**

*Acute Toxicity:*

- a) *Oral:* Non toxic - LD<sub>50</sub> 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.
- 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:*

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- 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.

### Disposal Considerations

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

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Transport Information

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