

INCO[®] Tonimet 97

Hazardous Ingredients

Hazardous Ingredients	Calculated Composition	C.A.S. No	PEL ¹ mg/m ³	TLV ^{1,2} –mg/m ³
Nickel (Ni)	97-97.2	7440-02-0	1	1.5*
Cobalt (Co)	1.0-1.6	7440-48-4	0.05	0.05
Copper (Cu)	0.1-0.2	7440-50-8	1	1
Iron (Fe)	0.4-0.7	7439-89-6	1	1
Silicates (eg. Ca,Mg,Al)	??	12627-13-3	n.av.	n.av.

*As inhalable fraction

Physical Data

Granules -- compact (20mmD x 10mmH)

Ingredient	Mol. Wt.	Specific Gravity	m.p. °C	b.p. °C	Sol. In H ₂ O g/100ml
Ni	58.71	8.9	1453	2732	0
Co	58.931	8.9	1495	2900	0
Cu	63.54	8.9	1083	2595	0
Fe	55.847	7.86	1535	3000	0
Silicates (Ca,Mg,Al)	n.av.	n.av.	n.av.	n.av.	n.av.

Fire or Explosion Hazard

None.

Health Hazards

Nickel

LD₅₀ ORAL RAT >9000 mg/kg

Inhalation:

The National Toxicology Program has listed nickel as reasonably anticipated to be a carcinogen based on the production of injection-site tumors. The International Agency for Research on Cancer (IARC) 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. 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.

The inhalation of nickel powder has not resulted in an increased incidence of malignant lung tumors in rodents.

Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats. Repeated intratracheal instillation of nickel powder did not produce an increased incidence of malignant lung tumors in hamsters when

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administered at the maximum tolerated dose. Single intratracheal instillations of nickel powder in hamsters at doses near the LD₅₀ produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas.

Inhalation of nickel powder at concentrations 15 times the PEL irritated the respiratory tract in rodents.

In 1997, the ACGIH proposed elemental nickel be classified: A5 "Not Suspected as a Human Carcinogen."

Skin Contact:

Prolonged and intimate contact with metallic nickel may cause irritation to the skin and nickel sensitivity which may result in allergic skin rashes.

One case has been reported of asthma induced by external exposure to a nickel-containing skin clip and by skin contact with nickel.

Wounds:

Nickel metal powder has caused tumors at the site of injection in rodents. However, studies do not suggest a significant risk for humans from nickel-containing prostheses.

Ingestion:

The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded there is no evidence that nickel and its inorganic compounds are carcinogenic when ingested. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient.

Preexisting
Conditions:

Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitized individuals.

Cobalt

LD₅₀ ORAL RAT: 7000 mg/kg

Inhalation:

Asthmatic symptoms and pulmonary fibrosis occurring in the tungsten carbide industry may be related to the inhalation of metallic cobalt dust. Evidence of polycythemia (an increase in the total red cell mass of the blood in the body) and altered thyroid, kidney and liver function have also been found.

Excessive doses of metallic cobalt have produced cardiac changes in miniature swine.

Skin Contact:

Repeated contact with metallic cobalt can cause cobalt sensitivity and allergic skin rashes.

Wounds:

Cobalt powders have caused tumors at the site of injection in rodents. However, studies of cobalt containing prostheses do not suggest a significant risk for humans.

Preexisting
Conditions:

Sensitized individuals may experience an allergic skin rash and/or asthma.

Copper

Inhalation:

Copper metal dust and fume may be irritating to the respiratory tract. In user operations where copper fume is generated, inhalation of the fume can result in symptoms of metal fume fever such as chills, fever and sweating.

Skin Contact: A few instances of allergic skin rashes have been reported in workers exposed to metallic copper.

Eye Contact: Copper metal as a foreign body in the eye can provoke an inflammatory reaction resulting in pus formation in the conjunctiva, cornea or sclera.

Ingestion: The lowest observed toxic oral dose of copper (TD_{Lo}) is 120 µg/kg in humans. This dose caused gastrointestinal effects.

Preexisting Conditions: Wilson's disease can occur in certain individuals with a rare inherited metabolic disorder characterized by retention of excessive amounts of copper in the liver, brain, kidneys and corneas. These deposits eventually lead to tissue necrosis and fibrosis, causing a variety of clinical effects, especially liver, (i.e. hepatic) disease and neurologic changes. Wilson's disease is progressive and, if untreated, leads to fatal liver (i.e. hepatic) failure.

Iron
LD₅₀ ORAL RAT 30 gm/kg

Eye Contact: Prolonged eye contact with the metal dust could cause rust-brown coloured spots forming around the particles and if left for several years, permanent damage could result.

Silicates (Ca, Mg, Al)
No information found.

Precautions for Safe Storage, Handling and Use

Do not inhale dust. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limits. If ventilation alone cannot so control exposure, use NIOSH-approved respirators selected according to OSHA 29 CFR 1910.134. Maintain airborne nickel levels as low as possible.

Avoid repeated skin contact. Wear suitable gloves. Wash skin thoroughly after handling. Launder clothing and gloves as needed.

Do not store near acids or reactive substances. Like other metals, nickel can react with acids to liberate hydrogen gas which can form explosive mixtures in air. Like other metal powders, nickel powder can react explosively or incandescently with substances such as ammonium nitrate, perchlorates, phosphorous, selenium, sulfur, etc.

Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, Ni(CO)₄, a toxic gas.

Spill, Leak and Disposal Procedure

Collect spills by wet sweeping or by vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if the exhaust is discharged into the workplace.

Wear appropriate NIOSH-approved respirators if collection and disposal of spills is likely to cause the concentration of airborne contaminants to exceed the exposure limits.

Metal-containing waste is normally collected to recover metal values. Should waste disposal be deemed necessary follow EPA and local regulations.

Emergency and First Aid Procedures

If exposure to nickel carbonyl is suspected, seek medical attention immediately. For skin rashes, seek medical attention. Cleanse wounds thoroughly to remove any particles.

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Note:

Inco believes that the information in this Material Safety Data Sheet is accurate. However, 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 OSHA Permissible Exposure Limit
- 2 Threshold Limit Value of the American Conference of Governmental Industrial Hygienists.
- 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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