

THE FACTS NICKEL

ROADMAP ON CARCINOGENS

Nickel, in the form of various alloys and compounds, has been in widespread commercial use for over 100 years. Several million workers worldwide are exposed to airborne fumes, dusts and mists containing nickel and its compounds. Nickel occurs naturally in the environment at low levels. Nickel compounds and metallic nickel have many industrial and commercial applications, including use in stainless steel and other nickel alloys, catalysts, batteries, pigments, and ceramics. Exposure occurs through inhalation, ingestion or skin contact. Skin complaints and respiratory effects have been reported from exposure to nickel. Studies have reported an increased risk of lung and nasal cancers from exposure to nickel refinery dusts and nickel subsulfide. Nickel compounds are classified as Group 1 carcinogen by the IARC, meaning they are carcinogenic to humans. Metallic Nickel as Group 2B, possibly carcinogenic to humans.

Where risks occur

Most workers exposed to nickel and nickel compounds in the European Union are in the manufacture of fabricated metal products, manufacture of machinery, except electrical and manufacture of transport equipment. Occupational exposure is common for workers involved in mining, smelting, welding, casting, spray-painting and grinding of nickel and nickel compounds.

More about the substance

Nickel is a silvery-white metallic element found in the earth's crust. It can be combined with other elements to form nickel compounds. Because of its unique properties, nickel has many industrial uses. Most nickel is used in metal alloys because it imparts useful properties, such as corrosion resistance, heat resistance, hardness, and strengths.

How symptoms can affect you

Occupational exposure to nickel occurs mainly through inhalation of dust particles and fumes or through skin contact. Acute exposure to high levels of nickel by inhalation can cause severe damage to the lungs and kidneys. Prolonged exposure to nickel refinery dust among nickel refinery workers leads to an increased risk of lung and nasal cancers. Nickel refinery dust is a mixture including many nickel compounds as well as other inorganic substances. Nickel subsulfide is the major constituent in refinery dust from the smelting of sulfidic ores. Chronic dermal exposure to nickel can lead to dermatitis with complaints such as dry, irritated or itchy skin. Chronic inhalation exposure to metallic nickel and water-insoluble nickel compounds can result in respiratory effects, including decreased lung function and bronchitis. Chronic exposure to soluble nickel compounds by inhalation can also result in asthma cases.

Latency period between exposure and nickel related cancer varies from 13 to 24 years.

What you can do

Perform proper exposure measurements continuously so it is known when actions should be taken. Investigate if workers report early symptoms.

The most effective way to prevent exposure is through elimination or substitution with substances which present less risks. If not possible processes should be (partially) enclosed and local exhaust ventilation should be used. Because metallic nickel and some nickel compounds can cause skin sensitisation, skin contact should be prevented as far as reasonably practicable. Where this is not possible, control measures will need to be introduced to minimise skin contact. These may include offering appropriate personal protective clothing, gloves and appropriate use of barrier creams. Personal protective equipment (PPE), which includes protective clothing and respiratory protective equipment/mask, should only be used when all other reasonably practicable measures have been taken but they have not achieved adequate control and there remains some residual risk.

References: IARC, NIEHS, CDC, HSE