

Nickel or compounds thereof

Definition of causal agent

Nickel is a lustrous, grayish white metal which is ductile, malleable and hard, with a fibrous structure.

Main occupational uses and sources of exposure:

Electrolytic nickel-plating; manufacture of nickel cadmium batteries; coin and kitchen utensil manufacture; preparation of special steels (heat and corrosion-resistant).

Toxic effects

☐ Allergic contact dermatitis (nickel itch)

See section on *Occupationally caused allergic contact dermatoses* in Annex I entry nr. 202.

☐ Asthma

See Annex I entry nr. 304.06 on *Allergic asthmas caused by the inhalation of substances consistently recognised as causing allergies and inherent to the type of work*.

☐ Cancer of the respiratory tract

Sinonasal cavities, ethmoid sinuses, trachea, bronchi, lung parenchyma.

There is no firm evidence that metallic nickel is carcinogenic to humans. With regards to the carcinogenicity of nickel species there is evidence implicating nickel sulphides and nickel oxides. It is unclear if solubility of nickel compounds is an important determining factor in carcinogenicity.

Exposure criteria (for cancer of the respiratory tract):

Minimum intensity of exposure: Occupational exposure confirmed by:

- History and study of working conditions providing evidence of prolonged or repeated exposure to nickel compounds
- and if available:
 - Biological monitoring (qualitative).
 - Workplace air monitoring.

Minimum duration of exposure: Six months.

Induction period: 15 years.

See section on *Occupational cancers* in the **Preface**.

Nickel carbonyl

Definition of causal agent

Nickel carbonyl, Ni (CO)₄ is a volatile liquid, easily decomposing into nickel and CO.

Main occupational uses and sources of exposure:

Intermediate product of nickel refining.

Toxic effects

□ Acute inhalation

First phase: immediate

Non-specific gastro-intestinal and neurological symptoms: nausea, vomiting, headache, dizziness, vertigo, profound weakness, etc.

Second phase: delayed

Insidious, signs and symptoms are delayed (12 to 36 hours), cough, hyperpnoea, cyanosis, tachycardia, chemical pneumonitis, acute pulmonary oedema, risk of respiratory failure, circulatory collapse, cerebral oedema resulting in death in five to 15 days. Possibility of the development of chronic respiratory insufficiency (sequelae).

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed, if possible assessed, by:

- History and study of working conditions providing evidence of intense exposure to nickel carbonyl;
- and if available:
 - biological monitoring: nickel in urine (qualitative);
 - workplace air monitoring.

Minimum duration of exposure: From a few minutes to a few hours, depending on intensity of exposure.

Maximum latent period: 48 hours.