

SAFETY INFORMATION SHEET (SIS) FOR NICKEL ALLOYS

Issue of November 2023

1. Identification of substance and company

1.1. Product identifier

Product name: Nickel alloy

Corrosion, heat and creep resisting grades with austenitic microstructure in massive product forms: semi-finished products, plate, sheet, strip, bar, rod, wire, tube, fittings.

1.2. Relevant identified uses of the mixture and uses advised against

The products are used e.g. in the chemical, oil and gas, aviation and nuclear industries, in demanding environments including corrosive conditions (e.g. with high chloride contents and/or strong acids) or in high temperatures including corrosive gases.

1.3. Details of the supplier of the safety information sheet

Manufacturer and supplier:

Alleima AB

S-811 81 SANDVIKEN

Sweden

Tel: +46 26 426 00 00

Website: www.alleima.com

Contact: ehs.miljoskydd@alleima.com

1.4. Emergency information

In case of emergency, contact your local authority advisor.

2. Hazards identification

2.1. Classification of the mixture

Classification	Hazard statement
Carc. 1B	H350 May cause cancer
Repr. 1B	H360F May damage fertility.
Muta. 2	H341 Suspected of causing genetic effects.
STOT RE 1	H372: Causes damage to organs through prolonged or repeated exposure
Skin Sens. 1	H317: May cause an allergic reaction
Resp. Sens. 1	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled

Table 1 Classification according to EC 1272/2008 regulation.

2.2. Label elements

Since these products are massive alloys, labelling is not required.

2.3. Other hazards

There are no hazards of concern for man or the environment from stainless steels in the forms supplied. However, if an individual is already sensitized to nickel, prolonged skin contact with a few

types of stainless steel may result in an allergic dermatological reaction. No carcinogenic effects resulting from exposure to stainless steels have been reported, either in epidemiological studies or in tests with animals. Dust and fume may be generated during processing e.g. in welding, cutting and grinding. If airborne concentrations of dust and fume are excessive, inhalation over long periods may affect workers' health, primarily of the lungs.

3. Composition/information on ingredients

Element	CAS number	EINECS number	Concentration wt-%	Classification	Hazard statement
Iron	7439-89-6	231-96-4	<50	-	-
Nickel	7440-02-0	231-111-4	38-75	Carc2 Skin Sens.1 STOT RE 1	H351: Suspected of causing cancer H317: May cause an allergic reaction H372: Causes damage to organs through prolonged or repeated exposure
Copper	7440-50-8	231-159-6	<34	-	-
Chromium	7440-47-3	231-157-5	<32	-	-
Manganese	7439-96-5	231-105-1	< 11	-	-
Molybdenum	7439-98-7	231-107-2	< 12	-	-
Cobalt	7440-48-4	231-158-0	< 2	Carc. 1B Repr. 1B Muta. 2 Skin Sens. 1 Resp. Sens 1 Aquatic Chronic 4	H350 May cause cancer. H360F May damage fertility. H341 Suspected of causing genetic effects. H317: May cause an allergic reaction. H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H413: May cause long lasting harmful effects to aquatic life.

Table 2 Composition and classification according to EC 1272/2008 regulation.

4. First aid measures

4.1. Description of first aid measures

There are no specific first aid measures developed for nickel alloys. Medical attention should be sought in case of an excessive inhalation of dust, a physical injury to the skin or to the eyes.

Note that austenitic stainless steel particles are non-magnetic or only slightly magnetic and may therefore not respond to a magnet placed over the eye.

4.2. Most important symptoms and effects both acute and delayed

No relevant information has been identified.

4.3. Indication of any immediate medical attention and special treatment needed

No relevant information has been identified.

5. Firefighting measures

5.1. Extinguishing media

Nickel alloys in massive form are not combustible.

However, care should be taken to avoid exposing fine process dust (e.g. from grinding and blasting operations) to high temperatures as it may present a potential fire hazard.

5.2. Special hazards arising from the mixture

None identified.

5.3. Advice for firefighters

None identified.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Not applicable.

6.2. Environmental precautions

Not applicable

6.3. Methods and material for containment and cleaning up

Not applicable

6.4 Reference to other sections

None.

7. Handling and storage

7.1. Precautions for safe handling

There are no special technical measures involved for handling nickel alloys. Normal precautions should be taken to avoid physical injury from coiled or bundled products, possibly with sharp edges.

Straps or bands, used to secure some products, should not be used for lifting. Coils and bundled products (e.g. sections, rods, bars etc.) may spring apart when the banding is removed and the banding itself could cause eye or other injury when tension is released.

Certain products may, as a result of processing, be brittle or have residual stress that might cause fracture or significant deformation.

All products are likely to have sharp edges that could cause lacerations and flying particles may be produced when shearing.

Suitable protective clothing and equipment, such as hand and eye protection, should be worn and systems of work adopted to take account of any hazards arising from the risk of fracturing or the

release of tension when breaking open banding.

Suitable racks should be used to ensure stability when stocking narrow coils.

7.2. Conditions for safe storage, including any incompatibilities

The product is stable in storage. However, it should be kept in mind that the products may display sharp edges and a sufficiently robust place capable of carrying the significant weight of the products should be used for storage.

7.3. Specific end uses

None identified.

8. Exposure controls/personal protection

8.1. Control parameters

Elements	TD	ID	RD
Iron oxide as Fe			3,5
Manganese and its inorganic compounds as Mn		0,2	0,05
Chromium and its compounds as Cr	0,5		
Copper and its inorganic compounds as Cu			0,01
Nickel as Ni	0,5		
Cobalt and its inorganic compounds as Co		0,02	
Molybdenum as Mo	10		5

Table 3 Occupational Exposure Limits, NGV, (mg/m³) in Sweden.

NGV=Nivågränsvärde(One working day exposure)

TD=Total dust

ID= Inhalable dust

RD=Respirable dust

8.2. Exposure controls

8.2.1. Appropriate engineering controls

In the processing of all metallic materials, exposure to fume and dust must be kept below any legally imposed limits.

Dust and fume may be generated in use, e.g. by cutting, grinding and welding processes, which may contain materials subject to exposure limits. To ensure these limits are not exceeded, adequate general or local ventilation or fume extraction should be provided.

8.2.2. Individual protection measures, such as personal protective equipment

In accordance with European and national health and safety regulations, it is necessary to assess the need for personal protection equipment and appropriate approved respiratory protection should be provided for those workers at risk of inhalation. Suitable hand and eye protection should be worn where there is a risk of laceration, flying particles, welding heat radiation or contact with oils during processing.

The process of welding should only be performed by trained workers with the personal protective equipment in accordance with the laws of each member state relating to safety.

8.2.3. Environmental exposure controls

Emissions from ventilation or equipment in the work place should be controlled in order to assure

that environmental legislation is fulfilled.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance: Solid; metallic grey, ranging from dull to bright polished. Occasionally supplied with oxidized, blue/black surfaces.

Odour: Odorless

Water solubility: Insoluble

Melting: 1300°C–1520°C

Density: 7.9 – 8.8 g/cm³

Thermal expansion (mean value 20-100°C): 12–15 x 10⁻⁶ °C⁻¹

Thermal conductivity (RT): 10–22 W/m °C

Magnetic: Nickel alloys are ferro-magnetic or non-magnetic depending on the chemical composition of specific grades.

9.2. Other information

Thermal conductivity at 20°C, 10-22 W/(m K), depending on specific grade.

Not explosive.

10. Stability and reactivity

10.1. Reactivity

Nickel alloys are stable and non-reactive under normal ambient atmospheric conditions.

10.2. Chemical stability

Nickel alloys are stable and non-reactive under normal ambient atmospheric conditions.

10.3. Possibility of hazardous reactions

May react in contact with strong acids, releasing gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen.

10.4. Conditions to avoid

When heated to very high temperatures fumes may be produced (e.g. by cutting, welding or melting operations).

10.5. Incompatible materials

May react in contact with strong acids, releasing gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen.

10.6. Hazardous decomposition products

See section 10.3. and 10.5.

11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Nickel alloys are not acute toxic.

Irritation

The exposure route of concern is inhalation. These nickel alloy products are in massive form, not

capable of being inhaled.

Corrosivity

Nickel alloys are not corrosive to skin.

Sensitization

Nickel is classified as a skin sensitizer. It causes skin sensitization in susceptible individuals through prolonged intimate contact with the skin (e.g. wearing of jewelry).

Repeated dose toxicity

During mechanical working, flame cutting or welding, dust, or fumes containing complex or mixed oxides (spinels) of its constituents, may be formed. Over long periods, inhalation of excessive airborne levels may have long term health effects, primarily affecting the lungs.

Carcinogenicity

Nickel metal has been classified, see section 2, Hazards identification. The exposure route of concern is inhalation. These nickel alloy products are in massive form, not capable of being inhaled.

Mutagenicity

Nickel alloys are not classified as mutagenic.

Toxicity for reproduction

Nickel alloys are not toxic for reproduction.

12. Ecological information

12.1. Toxicity.

Not ecotoxic.

12.2. Persistence and degradability

Not relevant.

12.3. Bioaccumulative potential

None.

12.4. Mobility in soil

Not soluble in water. Immobile.

12.5. Results of PBT and vPvB assessment

Not relevant.

12.6. Other adverse effects

No known harmful effects. No special precautions are required.

13. Disposal considerations

13.1 Waste treatment methods

Surplus and scrap (waste) stainless steel is valuable commodity and in demand for the production of prime nickel alloys and stainless steel.

Recycling routes are well-established, and recycling is therefore the preferred disposal route.

Disposal to landfill is not harmful to the environment, but is a waste of resources and therefore less desirable than recycling.

14. Transport information

No special precautions required.

The product is not classified as hazardous for transport.

15. Regulatory information

15.1. Safety, health and environmental regulation/legislation specific for the mixture

Nickel alloys are classified in the same way as nickel metal, see section 2.

2.

15.2. Chemical safety assessment

No chemical safety assessment has been published.

16. Other information

Food contact materials

The Council of Europe published “Metals and alloys used in food contact materials and articles – A practical guide for manufacturers and regulators, 1st ed 2013” to ensure that metallic materials used in contact with food comply with the regulation EC 1935/2004. The document includes a section on stainless steels.

References to regulations

Nickel alloy products are considered as articles under regulation EC 1907/2006, concerning the registration, evaluation, authorisation and restriction of chemicals (REACH). In accordance with REACH and regulation EC 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP) only substances and preparations require a safety data sheet (SDS). While articles under REACH do not require a classic SDS but articles shall be accompanied by sufficient information to permit safe use and disposal. In order to comply with this requirement a safety information sheet (SIS) has been developed.

Comments

Table 1, according to CLP, nickel alloys must be classified in the same way as nickel metal.

There is no direct evidence of carcinogenic effects of nickel alloys in man, nor indirect evidence from animals tested by relevant routes, i.e. inhalation or ingestion. In other studies, using non-relevant routes in animals, alloys with up to 40 % nickel caused no significant increase in cancer.

Studies of workers exposed to nickel powder and dust and fumes generated in the production of nickel alloys and stainless steels have not indicated a respiratory cancer hazard.

Numerous patch tests have established that most stainless steels do not cause sensitization. However, studies have shown that in some individuals already sensitized to nickel, close and prolonged skin contact with the re-sulphurised free-machining types of stainless steel with 0,15 – 0,35 % S (EN 1.4105, 1.4523, 1.4305, 1.4570) may cause an allergic reaction.

The uses of products that contain Ni and which come into direct and prolonged contact with the skin are limited by 2004/96/EC. Posts inserted into pierced ears and other parts of the body during epithelization of the wound must not contain more than 0,050 % Ni. Other Ni-containing products in direct and prolonged contact with the skin must release no more than 0,5 mg/cm²/week of Ni as defined in EN 1811.

Welding and flame cutting fumes may contain hexavalent chromium compounds. Studies have shown that some hexavalent chromium compounds can cause cancer. However, epidemiological

studies amongst welders indicate no extra increased risk of cancer when welding stainless steels, compared with the slightly increased risk when welding steels that do not contain chromium. The UK Health & Safety Executive's publication "Control of fume arising from electric arc welding of stainless steel" indicates that there is some risk of developing asthma from compounds of chromium VI and nickel in the fume from stainless steel welding. However, stainless steel welding fume did not meet the European Union classification criteria required for a substance capable of causing asthma.

Declaration

The information given in this safety information sheet is based on the present level of our knowledge and experience. The data sheet describes the products with respect to safety requirements. The data given is not intended as a confirmation of product properties and does not constitute a legal contractual relationship, nor should it be used as the basis for ordering these products.