

Safety information datasheet* (SIS) (Material Safety Data Sheet MSDS) for carbon steels and low alloyed steels

Issue of May 2018

SECTION 1: Identification of the mixture and of the company

1.1. Product identifier

Product name Carbon steels and Low alloyed steels.

The steels are in the massive product forms: semi-finished products, bar, rod, wire, tube and rings. The products are marketed under Ovako's trademarks, attribute brands and EN grade designations, also with designations according to various international and national standards.

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

The products are used extensively in the most varying applications, especially where there are demands on e.g. high strength, high fatigue resistance, good wear resistance and good machinability. However, these products have limited resistance against wet corrosion and high temperature corrosion in gases. This means that these Ovako products are used in many different industrial applications, such as in the bearing industry, general engineering, automotive, off road, fasteners, agriculture, hydraulics, mining, oil and gas, lifting equipment and other product segments.

1.3. Details of the Supplier of the Safety Information Sheet

Manufacturer, supplier

Ovako AB including any of its producing subsidiaries.

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SE-111 87 Stockholm

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Department supplying information

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1.4. Emergency information

In case of emergency, contact your local authority advisor.

SECTION 2: Hazards identification

2.1. Classification of the mixture

Some low alloy steels contain nickel as an alloying element. Nickel is classified in EC Directive 67/548/EEC as a suspect carcinogen (category 3 – R40) and as a skin sensitizer (R43).

The classification rules of EC Directive 99/45/EC dictate that any preparations with equal to or more than 1% content of nickel must automatically be classified as suspect carcinogens (R40). Stainless steels do not cause nickel sensitization by prolonged skin contact in humans. Nevertheless, all stainless steels with 1% or more nickel are classified as skin sensitizers.

Table 1 The corresponding classification according to EC regulations EC 1272/2008 Annex VI Table 3.1 and EC Directive 67/548/EEC:

EC 1272/2008		EC Directive 67/548/EEC
Hazard Class and Category Code	Hazard statement Code	
Carc. 2	H351	Carc. Cat 3, R40
STOT RE 1*	H372	T;R48/23
Skin Sens. 1	H317	R43

* Low alloy steels containing 1-10 % Ni are classified as STOT RE2. Low alloy steels containing less than 1 % Ni are not classified.

2.2. Label elements

Since these products are alloys, labeling is not required

2.3. Other hazards

There are no hazards of concern for man or the environment from carbon steels and low alloyed steels in the forms supplied. However, if an individual is already sensitized to nickel, prolonged skin contact with low alloyed steels containing nickel may result in an allergic dermatological reaction. If prolonged skin contact is involved in the processing of this product, please contact the supplier for advice. No carcinogenic effects resulting from exposure to these carbon steels and low alloyed 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.

SECTION 3: Composition/information on ingredients

Table 2

Element	CAS number	EINECS	Concentration, wt-%	Classification (EC 1272/2008 Annex VI Table 3.1.)	EC Directive 67/548/EEC
Nickel	7440-02-0	231-111-4	<6,2	Carc2; H351, STOT RE; H372, Skin Sens. 1; H317	Carc. Cat 3, R40 T;R48/23 R43
Chromium	7440-47-3	231-157-5	<5,2	-	
Molybdenum	7439-98-7	231-107-2	<2,2	-	
Manganese	7439-96-5	231-105-1	<2	-	
Iron	7439-89-6	231-096-4	balance	-	

SECTION 4: First aid measures

4.1. Description of first aid measures

There are no specific first aid measures developed for carbon steels and low alloyed steels.

Medical attention should be sought in case of an excessive inhalation of dust, a physical injury to the skin or to the eyes.

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.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

Carbon steels and low alloyed steels 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 fire-fighters

None identified.

SECTION 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

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

There are no special technical measures involved for handling steels. 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 use(s)

None identified.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

There are no occupational exposure limits for carbon steels and low alloyed steels. Occupational exposure limits apply to some constituent elements (Ni, Cr, Mn, Mo) and certain of their compounds. Table 3 shows limits according to current legislation in Sweden.

Table 3. Occupational Exposure Limits, NGV, (mg/m ³) IN SWEDEN.			
Element and compounds		TD	RD
Iron oxide	as Fe		3.5
Manganese and its inorganic compounds	as Mn		0,05
Chromium and its inorganic (II,III)-compounds	as Cr	0.5	
Copper and its inorganic compounds	as Cu		0,01
Nickel	as Ni	0.5	
Molybdenum and its insoluble compounds	as Mo	10	5

NGV = Nivågränsvärde (One working day exposure)

RD = Respirable Dust acc. to EN 481; TD = Total 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. 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.

SECTION 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 hard chrome plated, oxidized, blue/black surfaces.

Odor: Odorless

Water solubility: Insoluble

Melting: 1300°C – 1520°C

Density: 7.6 – 8.0 g/cm³

Thermal expansion (mean value 20-100°C): 11 – 13 x 10⁻⁶ °C⁻¹

Thermal conductivity (RT): 30 – 75 W/m°C

Magnetic: Carbon steels and low alloyed steels are ferromagnetic.

9.2. Other information

Thermal conductivity at 20°C, 30-75 W/(m K), depending on specific grade.

Not explosive.

SECTION 10: Stability and reactivity

10.1. Reactivity

Carbon steels and low alloyed steels are stable and non-reactive under normal ambient atmospheric conditions.

10.2. Chemical stability

Carbon steels and low alloyed steels are relatively stable and non-reactive under normal ambient atmospheric conditions. However, they can corrode (rust) with a rate that increases with increasing humidity and temperature. The consequences of any corrosion must be taken into account and the need for any surface treatment, e.g. painting or galvanizing, should be considered. In sufficiently corrosive environments, e.g. in the presence of chlorides or acids, alternative materials e.g. stainless steels, should be selected.

10.3. Possibility of hazardous reactions

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

10.6. Hazardous decomposition products

See section 10.3. and 10.5.

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity

Carbon steels and low alloyed steels are not acute toxic.

Irritation

The exposure route of concern is inhalation. These steel products are in massive form and not possible to inhale.

Corrosivity

Carbon steels and low alloyed steels 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 jewellery). The requirements of EC regulation EC 1272/2008 Annex VI Table 3.1 are such that alloys with 1% or more of nickel must, by default, also be classified as skin sensitizers.

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 nickel 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-A1.

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

Carbon steels and low alloyed steels may contain nickel, which has been classified, see section 2, Hazards identification. The exposure route of concern is inhalation. These steel products are in massive form, not capable of being inhaled.

The requirements of EC regulation EC 1272/2008 Annex VI Table 3.1 are such that all alloys with more than 1% nickel must be classified in the same way as nickel itself, by default.

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.

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 chromium containing steels, compared with the slightly increased risk when welding steels that do not contain chromium.

Mutagenicity

Carbon steels and low alloyed steels are not classified as mutagenic

Toxicity for reproduction

Carbon steels and low alloyed steels are not toxic for reproduction

SECTION 12: Ecological information

Toxicity

Not ecotoxic.

Persistence and degradability

Not relevant.

Bioaccumulative potential

None

Mobility in soil

Not soluble in water, and is present as Immobile.

Results of PBT and vPvB assessment

Not relevant.

Other adverse effects

No known harmful effects. No special precautions are required.

SECTION 13: Disposal considerations

Waste treatment methods

Surplus and scrap (waste) carbon steels and low alloyed steels are valuable commodity and in demand for the production of prime stainless steel.

Recycling routes are well-established, and recycling is therefore the preferred disposal route. Disposal to landfill is a waste of resources and therefore less desirable than recycling.

SECTION 14: Transport information

No special precautions required.

The product is not classified as hazardous for transport.

SECTION 15: Regulatory information

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

Steels containing 1% or more of nickel are classified in the same way as nickel, see section 2. "Hazards identification", in this document. However, in recognition of their essentially non-hazardous nature, these steels in the massive form are not required to be labeled as hazardous.

15.2. Chemical safety assessment

No chemical safety assessment has been published.

SECTION 16: Other information

Table 4				
EC 1272/2008			EC Directive 67/548/EEC	
Hazard Class and Category Code	Hazard statement Code	Hazard statement in full text	Code	Full text
Carc. 2	H351	Suspected of causing cancer	Carc. Cat 3, R40	Limited evidence of a carcinogenic effect.
STOT RE 1*	H372	Causes damage to organs through prolonged or repeated exposure	T;R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
Skin Sens. 1	H317	May cause an allergic skin reaction	R43	May cause sensitization by skin contact.

*Steels containing 1-10 % Ni are classified as STOT RE2. Steels containing less than 1 % Ni are not classified.

Food contact materials

The Council of Europe published "Guidelines on metals and alloys used as food contact materials" in April 2001 as a reference document to ensure that metallic materials used in contact with food comply with the regulation EC 1935/2004. The document includes one section on iron and one on stainless steel.

References to key data

N Becker: Cancer mortality among arc welders exposed to fumes containing chromium and nickel. Results of a third follow-up: 1989–1995.

1. Report of the International Committee on Nickel Carcinogenesis in Man: Scand J, Work Environ Health 1990, 16; 1–82
2. International Agency for Research on Cancer. Chromium, nickel and welding. 'IARC Monograph on the Evaluation of Carcinogenic Risks to Humans'. Lyon: IARC 1990.

References to national regulations

SWEDEN

AFS 2018:1 Hygieniska gränsvärden. (Hygienic limit values)

KIFS 2017:4 Klassificering och märkning av kemiska produkter. (Classification and labeling of chemical products)

KIFS 2017:7 Kemiska produkter och biotekniska organismer. (Chemical products and biotechnical organisms)

Finland

HTP Haitallisiki tunnetut pitoisuudet 2000 (www.occuphealth.fi)

EU

The steel products according to section 1 in this SIS, conform to requirements, regulations or guidance given in:

- Reach regulation EC 1907/2006
- Classification, Labeling and Packaging regulation EC 1272/2008.
- EU Directive 2004/96/EC, Directive on restrictions on the marketing and use of nickel for piercing post
- EU Directive 67/548/EEC, Directive on Dangerous Substances
- EU Directive 2011/65/EU of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. (RoHS).
- EN 1811+A1: Reference test method for release of nickel from products intended to come into direct and prolonged contact with skin.
- Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food

Ovako is third party certified according to the Environmental Management System, ISO 14001:2015
This certification requires full compliance with national and EU legislation within our area of business.

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.

Trademarks

Ovako Cromax, Ovako 280X, IQ-Steel, BQ-Steel, WR-Steel, SZ-Steel, M-Steel and Hybrid steel are trademarks owned by Ovako AB.

* Previous designation: Material safety datasheet (MSDS)