

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Trade Name: Stainless steel bars

Synonyms: Chromium-Nickel Alloys

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

Relevant Uses: The products are mainly used for manufacturing of consumer products or applications in process industry, transport, building and construction, power and energy, and food and beverage industry.

Uses advised against: Not applicable.

1.3. Details of the supplier of the safety data sheet

Name: Bollinghaus Steel S.A.

Address: Travessa da Indústria, Ap.2
2431-909 Vieira de Leiria

Telephone Number: (+351) 244 698 120

Fax Number: (+351) 244 695 892

Department supplying information: nneto@bollinghaus.pt

1.4. Emergency telephone number

In case of emergency, contact your local authority advisor.

European Emergence Number: 112

Company emergency contact: (+351) 244 698 120, available Monday to Friday, in normal working hours (8:00 to 17:00).

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture (*)

Many stainless steels contain nickel as an essential alloying element. All intentionally added alloying elements in Stainless Steel with the exception of nickel are not classified as hazardous.

Nickel metal carries a classification as a suspect carcinogen. It is classified as a Category 2; H351 carcinogen under GHS and CLP. Classification for carcinogenicity via inhalation is based on the content of Ni oxide as an impurity greater than 0.1%.

The classification rules of REGULATION (EC) No. 1272/2008 dictate that any mixture with equal to or more than 1% content of nickel must automatically be classified as suspect carcinogens (H351). 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 sensitisers and respiratory sensitisers.

Table 1. The corresponding classification according to EC Regulation No.1272/2008, Annex VI Table 3.

| | |
|------------------------------------|---|
| Stainless Steel ≤1% Ni | <i>No classification</i> |
| Stainless Steel 1%-10% Ni | Carcinogen Cat. 2 H351 (Inhalation) Skin Sensitizer 1 H317 STOT RE2 H373 (Inhalation) |
| Stainless Steel > 10% Ni | Carcinogen Cat. 2 H351 (Inhalation) Skin Sensitizer 1 H317 STOT RE1 H372 (Inhalation) |

Solid stainless steel products covered by this MSDS are shipped as non-flammable, non-explosive, non-reactive articles and do not constitute a hazardous material in solid form.

2.2. Label elements (*)

Labelling is not required, since these products are alloys and do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified as hazardous in accordance with the criteria of EC Regulation No.1272/2008.

2.3. Other hazards

The article does not meet the criteria for PBT or vPvB in its solid form.

Dust and fumes from welding and other processing are eye, skin and respiratory irritants and sensitizers may cause metal fume fever.

Cancer hazard. Dust and fumes can cause cancer.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances (*)

Stainless steels are iron alloys that contain more than 10.5% chromium and less than 1.2% carbon.

Table 2. Composition of stainless steel (1).

| Component | CAS Number | % by Weight |
|------------|------------|-------------|
| Chromium | 7440-47-3 | 12 - 20 |
| Nickel | 7440-02-0 | 4- 16 |
| Molybdenum | 7439-98-7 | 0 - 3 |
| Manganese | 7439-96-5 | 0 – 2.0 |
| Copper | 7440-50-8 | 0 – 0.6 |
| Silicon | 7440-21-3 | 0 – 0.6 |
| Cobalt | 7440-48-4 | 0 – 0.6 |
| Titanium | 7440-32-6 | 0 – 0.01 |

(1) Other elements may be present such as Carbon, Nitrogen, Sulfur, Phosphorous, Boron, Aluminum, Tantalum and Tungsten. These are not classified as hazardous, or are below the concentration levels for classification of these alloys as hazardous.

For more information on the chemical composition of standard stainless steels: see EN 10088-1:2014.

4. FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact: In case of irritation from particulate, immediately flush with plenty of water for 15 minutes and call for medical assistance. Austenitic stainless steel particles are not magnetic and will not respond to a magnet over the eye.

Skin contact: In case of skin irritation or laceration, wash thoroughly with plenty of soap and water.

Inhalation: Not applicable to stainless steel in massive form.

Inhalation of dust and/or fumes from grinding, cutting and welding operations – If breathing is difficult remove person from exposed area to fresh air.

Ingestion: Accidental ingestion is unlikely. If ingested, call for medical assistance.

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

Stainless steels are not combustible. There are no special hazards or precautions associated with stainless steels if in vicinity of a fire.

6. ACCIDENTAL RELEASE MEASURES

Not applicable.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

There are no special technical measures involved for handling stainless steels. Normal precautions should be taken to avoid physical injury from bundled products, possibly with sharp edges:

- Straps or bands, used to secure some products, should not be used for lifting. Bundled products 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.

7.2. Conditions for safe storage, including any incompatibilities

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

Incompatibilities are not known.

7.3. Specific end use(s)

The products are mainly used for manufacturing of consumer products or applications in process industry, transport, building and construction, power and energy, and food and beverage industry. They are marked with designations according to European standards (e.g. EN10088).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters (*)

There are no occupational exposure limits for stainless steels. Occupational exposure limits apply to some constituent elements (Ni, Cr, Mn, Mo) and certain of their compounds and differs country to country.

Table 3: Occupational Exposure Limits according to NP 1796:2014 (Portugal).

| Component | | Occupational Exposure Limits (in Portugal) | |
|---------------------------------------|-------|--|----------|
| | | TLV-TWA | STEL |
| Iron oxide, dust & fume | as Fe | 5 mg/m ³ | - |
| Manganese, inorganic compounds | as Mn | 0,2 mg/m ³ | - |
| Chromium metal and Cr(III) compounds | as Cr | 0,5 mg/m ³ | - |
| Cr(VI)compounds, water soluble | as Cr | 0,05 mg/m ³ | - |
| Cr(VI) compounds, insoluble | as Cr | 0,01 mg/m ³ | - |
| Nickel, elemental metallic | as Ni | 1,5 mg/m ³ | - |
| Nickel, soluble inorganic compounds | as Ni | 0,1 mg/m ³ | - |
| Nickel, insoluble inorganic compounds | as Ni | 0,2 mg/m ³ | - |
| Nickel, subsulfide | as Ni | 0,1 mg/m ³ | - |
| Nickel, carbonyl | as Ni | - | 0,05 ppm |

Time-weighted average (TLV-TWA) - concentration for a working day of 8 hours and 40 hours a week, to which considers that nearly all workers may be exposed, day after day without health adverse effects.

Short-term Exposure Limits (STEL). - concentration which it considers that nearly all workers may be repeatedly exposed for short periods of time, since the value of TWA is not exceeded and without the occurrence adverse effects

It is strongly recommended that you check the relevant national legislation. More information can be found on the pages of European Agency for Safety and Health at Work site.

8.2. Exposure controls

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.

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.

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

Color: Varying from dull very light grey, to shiny metallic light grey to bright mirror-finish.

Odor: Odorless

Odor threshold: Not applicable

Physical state: Solid

pH: Not applicable

Melting point: 2500 – 2760 °F (1370 – 1520 °C)

Boiling point: Not applicable

Flash point: Not applicable

Evaporation rate: Not applicable

Flammability: Not applicable

Explosive limits: Not applicable

Vapor pressure: Not applicable

Vapor density: Not applicable

Specific gravity: 0.27 - 0.30 lbs./in³ (7.7 – 8.1 kg/dm³)

Solubility (water): Insoluble

Partition coefficient: Not applicable

Auto-ignition temperature: Not applicable

Decomposition temperature: Not applicable

Thermal expansion (ambient to 100°C): 10 – 16 x10⁶ m/m °C

Thermal conductivity (ambient temperature): 12 – 30 W/m °C

Magnetic: Austenitic stainless steels are non-magnetic in most supply conditions, but may be para-magnetic in some supply conditions. Duplex, ferritic and martensitic stainless steels are magnetic.

9.2. Other information

Not available.

10. STABILITY AND REACTIVITY

10.1. Reactivity

Stable and non-reactive under normal ambient atmospheric conditions.

10.2. Possibility of hazardous reactions

May react in contact with strong acids to release gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen. Use of strong oxidizers (high pH) on stainless steel may cause Cr(VI) compounds to form at ambient temperatures.

10.3. Conditions to avoid

Contact with incompatible materials. See Section 10.4..

Avoid creating finely divided, concentrated airborne particulates in the presence of ignition sources.

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

10.4. Incompatible materials

Oxidizers. See section 10.2..

10.5. Hazardous decomposition products

Welding fumes: Various fumes and gases may be produced when stainless steel is subjected to welding, brazing, thermal cutting, and similar processes at high temperature. Such fumes and gases cannot be simply classified. The composition and quantity of both are dependent upon the composition of the base metal and the process, procedures, and consumables being used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include; coatings on the base metal (such as paint, plating, galvanizing, and phosphate coatings), the number of workers performing welding, brazing, thermal cutting, or other related operations, the volume of the work area, the quantity of consumables used, the design and amount of ventilation delivered, the position of the worker's head with respect to the fume plume, and the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from solvent, cleaning, or painting activities) which may decompose by the arc into toxic gases such as phosgene.

Decomposition products from welding, brazing, thermal cutting operations will include those originating from the volatilization, reaction, or oxidation of ingredients in welding rods, fluxes, and fillers, plus those from the

base metal and coatings, etc. Possible decomposition products that may be generated during welding, brazing or thermal cutting include complex oxides of the ingredients listed in Section 3. Fumes generated during welding, brazing, or thermal cutting may contain: chromium compounds, including hexavalent chromium (Cr VI); nickel; manganese; iron; molybdenum; and silicon compounds.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

In its solid form stainless steel does not present an inhalation, absorption, or ingestion hazard.

Acute toxicity: Stainless steels are not acute toxic.

Irritation: The exposure route of concern is inhalation. These stainless steel products are in massive form, not capable of being inhaled.

Corrosivity: Stainless steels are not corrosive to skin.

Sensitisation: 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.

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: Stainless steels may contain nickel, which has been classified, see section 2, Hazard classification. The exposure route of concern is inhalation. These stainless steel products are in massive form, not capable of being inhaled.

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.

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.

Mutagenicity: Stainless steels are not classified as mutagenic.

Toxicity for reproduction: Stainless steels are not toxic for reproduction.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

Not applicable for solid steel product in its as shipped form. Articles produced from solid product do not represent an ecological hazard. No information found on specific product to establish its effect if released into the environment in finely divided form. However, it is believed that finely divided product, based on its

components will be hazardous to fish, animals and the environment if released, the degree of which would depend on the particle size and quantity released. If particles are small enough, material be ingested by wildlife with possible toxic effects.

12.2. Persistence and degradability

This material may persist in the environment for long periods, based upon its corrosion resistant, insoluble, and non-biodegradable properties.

12.3. Bioaccumulative potential

Heavy metals may contaminate the food chain and ultimately be consumed by humans.

12.4. Mobility in soil

The solid product is not expected to migrate easily into soil or groundwater based upon its insoluble form, however, finely divided material can become mobile in water and contaminated soil and groundwater.

12.5. Results of PBT and vPvB assessment

Not relevant for inorganic substances.

12.6. Other adverse effects

Not known.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods (*)

Stainless steel is part of an integrated life cycle and it is a material that is 100% recyclable. Surplus and scrap (waste) stainless steel is valuable and in demand for the production of prime new 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 it is a waste of resources and therefore less desirable than recycling.

EWC codes proposals:

12 01 01 (if resultant from shaping and physical and mechanical surface treatment of metals);

16 01 17 (if resultant from dismantling of end-of-life vehicles and vehicle maintenance);

17 04 05 (if resultant from construction and demolition wastes);

19 10 01 (if resultant of wastes from shredding of metal-containing wastes);

19 12 02 (if resultant from the mechanical treatment of waste);

14. TRANSPORT INFORMATION

| UN number | UN proper shipping name | Transport hazard class(es) | Packing group |
|---|---|---|---|
| Not applicable for solid formed product | Not applicable for solid formed product | Not applicable for solid formed product | Not applicable for solid formed product |

14.1. Environmental hazards

Not known.

14.2. Special precautions for user

No special precautions required.

14.3. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

The product is not classified as hazardous for transport.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

No authorizations are needed for use of the product.

There are no restrictions to the use of the product.

15.2. Chemical safety assessment

No chemical safety assessment has been published.

16. OTHER INFORMATION

» **Full text of H-Statements referred to under sections 2 and 3**

H317: May cause an allergic skin reaction

H351: Suspected of causing cancer

H372: Causes damage to organs through prolonged or repeated exposure

H373: May cause damage to organs through prolonged or repeated exposure

» **Acronyms**

CAS - Chemical Abstracts Service

STEL - Short-term Exposure Limits

CLP - Classification, Labelling and Packaging

TLV - Threshold Limit Value

GHS - Global Harmonisation System

TWA - Time Weighted Average

MSDS – Material Safety Data Sheet

vPvB - very Persistent, very Bioaccumulative

PBT - Persistent, Bioaccumulative, Toxic

» References to Legislation and Standards

EU

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

- REACH regulation EC 1907/2006, amended by EU Regulation 453/2010 of 20 May 2010
- Classification, Labelling and Packaging regulation EC 1272/2008.
- EU Directive 2006/122/EG, i.e. the 30th amendment of the Directive 76/769/EEG of the 12th of December 2006. The directive 76/769/EEG is used for controlling the risks for human health and the environment caused by hazardous substances.
- EU Directive 2002/95/EC of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. (RoHS).
- EN 10088-1:2014 - Stainless steels - Part 1: List of stainless steels

Portugal

- NP 1796:2014 - Occupational Health and Safety. Occupational exposure limits and biological exposure indices to chemical agents.

» Other Sources of information

- European Chemicals Agency (ECHA):
ANNEX XVII TO REACH – Conditions of restriction - (Entry 27: Nickel)
Nickel - C&L Inventory
Nickel Registration Dossier

Note

The percent composition in Section 2 reflects the range that is possible within this group of products. These are not the technical specifications for a particular product. Also, specific grades may not include all of the hazardous ingredients in Section 2.

Declaration

The information given in this safety data sheet is based on the present level of knowledge of our materials suppliers and studies developed. The data sheet describes the products with respect to safety requirements. The information applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other material or in any other product form. 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.

Revision Information

This revision replaces the revision 11/2014. The alterations are reflected in the subchapters marked with (*).