



SAFETY INFORMATION SHEET (SIS)

1. PRODUCT IDENTIFICATION

Article description: Stainless steel drawn wire and rods

Stainless steel drawn wire and rods are considered as articles under Regulation (EC) 1907/2006 concerning Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH), a position adopted by all European stainless steel producers as presented in the EUROFER position paper determining the borderline between preparation and articles for steel and steel products.

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, Eurofer members have developed a **Safety Information Sheet (SIS)** that provides information on the safe use of the stainless steel and its potential impacts on both human health and the environment.

Article name: Specialised Welding Products stainless steel drawn wire and rods according to the relevant international standard: e.g. EN 10088-3 for general purpose applications, ISO 14343 for welding applications.

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2. HAZARDS IDENTIFICATION

Stainless steels are generally considered non-hazardous to human health or the environment and regularly applied where safety and hygiene is of utmost importance (e.g. equipment in contact with drinking water, food contact materials, medical devices, etc).

Nickel is the only substance of major importance with regard to the hazard classification of stainless steels in the solid form. In accordance with (EC) Regulations 1272/2008 (CLP) and 790/2009 (ATP 1), nickel is classified as a Carcinogen Category 2, Specific Target Organ Toxicity Repeated Exposure 1 and Skin Sensitizer 1.

The CPL Regulation has introduced changes in the classification of nickel when compared with the Dangerous Substance and Dangerous Preparations Directives, which it superseded. Table 1 below provides a direct comparison of the hazard classification of nickel provided by these items of legislation.

Table 1 – Hazard Classifications of Nickel metal (massive form)

CLP Regulation	Directives 67/548/EEC & 1999/45/EC	Comments
Hazard	Hazard	
Carc Cat 2	Carc Cat 3 R40	No change
Skin Sens 1	R43	No change
STOT RE 1	(T; R48/23)	New

2.1 Sensitization

Tests conducted in accordance with EN 1811 determined that stainless steels release nickel at levels significantly below the criteria set for classification as a skin sensitizer. Thus, stainless steels in general are suitable for use as piercing posts (where the maximum nickel release limits is 0.2 µg/cm²/week) and for applications involving close and prolonged contact with the skin (where the maximum nickel release limits is 0.5 µg/cm²/week).

However, tests conducted in accordance with EN 1811 have shown that the resulphurised free-machining stainless steels (containing 0.15 – 0.30 % sulphur) release nickel at levels close to, or above, the maximum nickel release limits of 0.5 µg/cm²/week. Resulphurised free-machining stainless steels are, therefore, not recommended for use as piercing posts or for applications involving prolonged and close with the skin (i.e. jewellery, watch backs and watch straps, etc).

Clinical studies did not reveal any risk of allergy among individual already sensitised to nickel. Thus, frequent intermittent contact with stainless steels of all types should not pose a problem to downstream users or consumers.

2.2 Specific Target Organ Toxicity

In accordance with the CLP Regulation, stainless steels containing more than 10% nickel should be classified as Specific Target Organ Toxicity Repeated Exposure 1 (STOT RE1) and stainless steels containing 1 -10% nickel should be classified as STOT RE 2. Stainless steels containing less than 1% Ni are not classified.

2.3 Carcinogenicity

In accordance with the CLP Regulation, stainless steels containing more than 1% nickel should be classified as Carcinogen Category 2 when it is classified as a simple mixture. However, no carcinogenic effects resulting from exposure to stainless steels have been reported, either in epidemiological studies or in tests with animals. In addition, IARC (International Agency for Research on Cancer) has concluded that stainless steel implants are not classifiable as to their carcinogenicity to humans. Stainless steels containing less than 1% Ni are not classified.

2.4 Specific process and exposure controls

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. Dust and fume quantity and composition depend on specific practice.

Oxidized forms of the various alloying elements of stainless steel may be found in welding fumes.

Over long periods, inhalation of excessive airborne levels may have long term health effects, primarily affecting the lungs. 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 stainless steels, compared with the slightly increased risk when welding steels that do not contain chromium.

Chromium in stainless steel is in the metallic state (zero valence) and stainless steel does not contain hexavalent chromium.

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.

Guidance on the welding of metals and alloys is provided on the EUROFER website (www.eurofer.org). The guidance document will provide background information on health hazards posed by welding processes and appropriate risk management measures.

There are no specific occupational exposure limits for stainless steel. However, specific occupational exposure limits have been established for some constituent elements and compounds. Users of this Safety Information Sheet are strongly advised to refer to the occupational exposure limits set by their EU Member State for the substances in stainless steel and, where relevant, welding fumes.

3. COMPOSITION / INFORMATION ON INGREDIENTS

These products are continuous metal wire and solid metal rods: hereby are considered main elements of the articles. Other elements may be present. For more information on the chemical composition of standard stainless steels, see the relevant international standards.

Ingredients	Weight % ⁽¹⁾	CAS#	EINECS#	Hazard classification ⁽²⁾	IARC ⁽³⁾	NTP ⁽⁴⁾	OSHA List ⁽⁵⁾
Carbon	< 1.0	7440-44-0	231-153-3	No	--	--	--
Chromium	< 36.0	7440-47-3	231-157-5	No	--	--	--
Copper	< 4.0	7440-50-8	231-159-6	No	--	--	--
Iron	balance	7439-89-6	231-096-4	No	--	--	--
Manganese	< 15.0	7439-96-5	231-105-1	No	--	--	--
Molybdenum	< 5.2	7439-98-7	231-107-2	No	--	--	--
Nickel	< 46.0	7440-02-0	231-111-4	Carc. Cat. 2; Skin Sens 1; STOT RE 1	2B	S	
Niobium	< 1.35	7440-03-1	231-113-5	No	--	--	--
Silicon	<3.3	7440-21-3	231-130-8	No	--	--	--

- (1) For reference only maximum typical concentration for each element. Traces of other elements may be present in negligible quantities.
- (2) EC Regulation 1272/2008 (CLP)
- (3) Evaluation according to the International Agency for Research on Cancer.
1: Carcinogenic to humans. 2A: Probably carcinogenic to humans. 2B: Possibly carcinogenic to humans.
- (4) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
K: Known Carcinogen S: Suspect Carcinogen
- (5) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

4. FIRST AID MEASURES

There are no specific First Aid Measures developed for the stainless steel. Medical attention should be provided in case of an excessive inhalation of dust or a physical injury to the skin or to the eyes.

Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.

Eye contact: To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.

Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.

5. FIRE FIGHTING MEASURES

No specific recommendations for stainless steel articles at the solid state.

Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. In case, extinguish with powder. Do not use water, CO₂ or foam. The use of water to extinguish a fire of metals can generate hydrogen gas with the risk of explosion, especially if in a confined area.

Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Not applicable.

7. HANDLING AND STORAGE

There are no special measures for handling stainless steels. Normal precautions should be taken to avoid physical injuries produced mainly by sharp edges. Personal protective equipment must be used e.g. special gloves and eye protection.

Handling: Handle with care to avoid cuts and stings. The spooled wire can unwind itself with a spring effect. Wear gloves when handling stainless steel articles. Avoid exposure to dust. Do not ingest.

Storage: Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

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.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures: During the operations of welding, brazing, heating, cutting, or other operations which can give rise to particulates, ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective equipment clean and dry. Check condition of protective equipment and equipment on a regular basis.



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Personal protective equipment: Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Wear eyes protection like safety glasses during operations of welding, brazing, heating, cutting, or other operations which can give raise to particulates.

If needed due to the working environment conditions, use additional protective equipment and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1000°C / >1800°F

Colour: silver-grey

Odour: odourless

Water solubility: insoluble

10. STABILITY AND REACTIVITY

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products could include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and of the base metal and coating. The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 1 to 10 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Cr, Ni, Si, Mo, Cu, W, and Nb. The rest is not analyzed, according to available standards.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to the health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

12. ECOLOGICAL INFORMATION

There are no hazards to the environment from stainless steel in the forms supplied.

Welding consumables and materials could degrade, due to the exposure to weather, into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

13. DISPOSAL CONSIDERATIONS

Stainless steel is part of an integrated life cycle and it is a material that is 100% recyclable. Thus, 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. While disposal to landfill is not harmful to the environment, it is a waste of resources and therefore to be avoided for the benefit of recycling.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.



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14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's safety instructions, if any, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

16. OTHER INFORMATION

- + Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- + Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures
- + Regulation (EC) No 790/2009 1st Adaptation to Technical Progress (ATP) to the CLP Regulation
- + Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances
- + Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations
- + REACH and the Welding of Metals and Alloys (May 2010):
<http://www.eurofer.org/index.php/eng/REACH/Documents-and-useful-web-links/Welding>
- + Review on toxicity of stainless steel, Finnish Institute of Occupational Health (FIOH), 2010:
http://www.ttl.fi/en/publications/Electronic_publications/Pages/default.aspx
- + Manufacture, processing and use of stainless steel: A review of the health effects, EUROFER, 1999:
<http://www.eurofer.org/index.php/eng/News-Publications/Publications>
- + American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at <http://www.aws.org>
- + OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
- + NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
- + WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".
- + Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

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Therefore, we do not assume any responsibility and expressly reject any liability for loss, damage or expense that might result from handling, storage, use or disposal of the product or that are connected to them in any way.

This safety information sheet has been prepared for this product and should only be used in relation to it. If the product is used as a component in another product, the information contained in the safety information sheet may not apply.

DISCLAIMER:

This safety informative sheet (SIS) is only intended to provide for reference only information. It can not in any way be regarded as a safety data sheet (SDS), nor in any way be used for this purpose.