

Stainless Steels

Safety Data Sheet

1. Identification of the Substance and company

1.1 Product identifier

Other names:	Rust-free Steel, Corrosion Resistant Steel
Description:	Corrosion, heat and creep resisting grades with an austenitic, ferritic, martensitic or duplex microstructure in massive product forms: semi-finished products, plate, sheet, strip, bar, tube, fittings, wire rod, wire. All stainless steels contain a minimum of 10.5% chromium, which ensures the formation of a protective, adherent nanometric, oxide film covering the entire surface. Thus, the alloying elements in stainless steel are firmly bonded in its chemical matrix. Increasing the chromium content beyond the minimum of 10.5% confers still greater corrosion resistance.

1.2 Relevant identified uses

Used in many applications such as construction, automotive, energy/power, transport, defence and security, engineering, consumer products, lifting and excavating and packaging and medical.

1.3 Details of supplier

Company:	Tata Steel Speciality, Manchester Road, Stocksbridge, Sheffield, S36 2JA
Telephone:	+44 (0) 114 2882361
Normal Hours:	Commercial / Technical support
Email:	reach@tatasteel.com

1.4 Emergency contact

Emergency:	Contact Security Department
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2. Hazards Identification

2.1 Classification

Stainless Steels are defined as an article under REACH. However, some of the components do meet the requirements for classification as dangerous under both the EU Dangerous Substances (67/548/EEC) Directive and the Classification, Labelling and Packaging of substances and mixtures (CLP) regulations (EC 1272/2008). These being Nickel and Cobalt, the classification for all alloying elements are given in section 3. Stainless steels are generally considered non-hazardous to human health or the environment. Stainless steels are used in applications where safety and hygiene is of utmost importance (e.g. drinking water, food contact materials, medical devices, etc).

Activities such as mechanical working, dry grinding / sanding and hot working such as welding or flame cutting may give rise to irritant dust / fumes. (From the constituents of the steel and consumables).

2.2 Label elements according to CLP regulations (EC)1272/2008

No label required, no signal word required.

2.3 Other hazards

Pre-finished steel can have sharp edges and corners, and relevant precautions should be taken when handling and storing. Under normal conditions of use and storage these materials are stable and non-toxic. Some steels may be coated with non-hazardous oil, however prolonged exposure/contact may give rise to skin irritation.

3. Composition / information on ingredients

Refers to steels usually containing between 10-25% chromium together with appreciable amounts of other specified elements such as nickel, manganese molybdenum, copper, vanadium, niobium, titanium, tungsten and cobalt. Carbon is only specifically added to a small number of these grades. The concentrations of these latter elements will vary according to customer requirements, but may add up to a



further 10-15%. For more details reference should be made to British or other national/international standards or customer specification. There may be a protective or residual coating of oil on the sheet. Some products are supplied with a coating such as primer or bitumen. In these cases additional information will be provided.

Table showing typical composition of Stainless Steel

Product area	Substance	EINECS No.	CAS No.	Range (%) by weight	Classification (Dangerous Sub Dir)	Classification (CLP Regs)
Steel substrate	Iron	231-096-4	7439-89-6	Balance	Not classified	Not classified
	Chromium	231-157-3	7440-47-3	10.0 – 25.0	Not classified	Not classified
	Nickel	231-111-4	7440-02-0	0.3 – 12.0	R40, R43, R48/23	H350, H372, H317
	Manganese	231-105-1	7439-96-5	0.3 – 2.0	Not classified	Not classified
	Molybdenum	231-107-2	7439-98-7	0.01 – 2.0	Not classified	Not classified
	Copper	231-159-6	7440-50-8	0.03 – 3.5	Not classified	Not classified
	Vanadium	231-171-1	7440-62-2	0.01 – 0.5	Not classified	Not classified
	Carbon	231-153-3	7440-44-0	0.1 – 1.1	Not classified	Not classified
Cobalt*	231-158-0	7440-48-4	5.0 – 7.0	R42/43, R53	H317, H334, H413	

*Cobalt is only added to certain grades of stainless steels depending on customer requirements

4. First aid measures

4.1 Description of first aid measures

Skin contact: Cuts (lacerations) to the skin from sharp steel edges, treat as a normal cut and if required seek medical attention. Wash if contaminated with oil coating.

Eye contact: If particles enter the eye then wash the eye with running water for at least ten minutes. Seek medical advice if irritation persists.

Inhalation: If hot work such as welding / burning causes exposure to significant concentrations of fume/dust, remove to fresh air. Seek medical attention if symptoms such as coughing persist.

Ingestion: None required.

4.2 Most important symptoms and effects

The most important symptoms and effects for eye exposure are soreness and irritation are the main symptoms.

4.3 Indication of any immediate medical attention or treatment

Immediate medical attention is required if lacerations are deep.

5. Fire fighting measures

Stainless Steels are non-flammable and has a melting point of >1000 °C.

6. Accidental release measures

Stainless Steels are sold in solid massive form and an accidental spill could not be achieved.

7. Handling and Storage

7.1 Handling

Stainless Steels are sold in many forms, ingot, sheet, coils, sections, tube, pipe, plate or in semi finished products. Care should be taken when handling, as there may be sharp edges present. Where required the use of hard wearing (protective) gloves and overalls could be used to prevent cuts and abrasions. Care should be taken when lifting heavy loads and where necessary use appropriate lifting equipment to do so. Coil bundles may be secured by banding straps, which may have been fitted under tension so care should be taken to remove those and lifting should not be carried out by using those straps. Straps or bands should not be used for lifting.



7.2 Storage

Some products may be secured by using straps or bands but they could cause injury to eyes or other injuries when tension is released. There may be sharp edges present, which could cause lacerations. Store in the appropriate facility to prevent damage, use suitable racks or storage pallets. Lifting should always be done to prevent personal (injury) damage to the operators and lifting equipment is advised at all time to move the steel unless a full risk assessment has been carried out.

8. Exposure controls and personal protection

8.1 Control parameters (Occupational Exposure Limits (OELs))

Please note these exposure limits are not always directly associated with the product but with possible exposures that may occur when performing certain activities.

OELs (GESTIS International Limit Values Institut fuer Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA) & EH40)

Country in EU with OEL for the relevant substance	Substance					
	Iron oxide (Fe ₂ O ₃ & FeO) as Iron		Nickel, water soluble compounds (as Ni)		Nickel, water insoluble compounds (as Ni)	
	8hr TWA (mg/m ³)	STEL (mg/m ³)	8hr TWA (mg/m ³)	STEL (mg/m ³)	8hr TWA (mg/m ³)	STEL (mg/m ³)
Austria	5.0 (resp)	10.0 (resp)	0.1	---	0.05	0.1
Belgium	5.0	---	0.1	---	0.1	---
Denmark	3.5	7.0	0.01	0.02	0.01	0.02
France	---	---	---	---	---	---
Germany (AGS)	---	---	---	---	---	---
Germany (DFG)	---	---	---	---	---	---
Hungary	6.0 (resp)	---	0.1	0.1	0.1	0.1
Poland	5.0	10.0	---	---	---	---
Spain	5.0	---	0.1	---	0.1	---
The Netherlands	---	---	---	---	---	---
United Kingdom	5.0	---	0.1	---	0.5	---

TWA - Time Weighted Average measured over an 8 hour period
 STEL - Short Term Exposure Limit Value – 15 minute duration
 Resp - Respirable fraction of dust

Country in EU with OEL for the relevant substance	Substance					
	Manganese & Inorganic compounds (as Mn)		Cobalt and compounds (as Co)		Chromium (VI) compounds (as Cr)	
	8hr TWA (mg/m ³)	STEL (mg/m ³)	8hr TWA (mg/m ³)	STEL (mg/m ³)	8hr TWA (mg/m ³)	STEL (mg/m ³)
Austria	0.5	2.0	0.1	0.4	0.05	0.2
Belgium	0.2	---	0.02	---	0.05	---
Denmark	0.2	0.4	0.01	0.02	0.005	0.01
France	---	---	---	---	0.001	0.005
Germany (AGS)	0.5	---	---	---	---	---
Germany (DFG)	0.2	---	---	---	---	---
Hungary	5.0	20.0	0.1	0.4	---	0.05
Poland	0.3	---	---	---	---	---
Spain	0.2	---	0.02	---	0.01	---
The Netherlands	---	---	0.02	---	0.025	0.05
United Kingdom	0.5	---	0.1	20.0	0.05	---

TWA - Time Weighted Average measured over an 8 hour period
 STEL - Short Term Exposure Limit Value – 15 minute duration
 Resp - Respirable fraction of dust
 Nickel DNEL (Derived no effect level) Long-term (systematic) = 0.05 mg/m³, Acute (local) = 1.6 mg/m³

8.2 Control Measures

Wear suitable gloves, overalls and eye/face protection when handling the pre-finished steel to prevent cuts and abrasions.

If hot work activities such as welding or burning or mechanical abrasion are to take place then local exhaust ventilation (LEV) should be used to remove any fume produced. During the use of LEV systems the manufacturers instructions and guidance should be followed at all times so that there is sufficient capture hood and capture velocity and the air cleaning system is in good working order. If a large



amount of fume is generated then in conjunction with the LEV, use of suitable and approved respiratory protection should be worn if exposure is likely to be above the OEL. Ori-nasal respirators fitted with either a P2 or P3 filter (EN149: FFP2S / FFP3S) may be used when fume levels are high depending on concentration. Manufacturers directions for use must be followed and where applicable an RPE face fit test should be successfully completed before use. It should be necessary to prove a tight fitting face seal via face fit testing.

9. Physical and chemical properties

Property	Value used
Physical State at 20°C/ 1013 hPa	Solid
Form	Stainless steel is a hard, silver/grey coloured metallic solid
Melting point	1325-1530 °C at 1013 hPa (steel)
Boiling point	Not applicable
Relative density	7.7-8.3 kg/dm ³ at 20 °C
Vapour pressure	Not applicable steels due to high melting point >1000 °C
Surface tension	Not applicable, steels are an inorganic solid with very low aqueous solubility
Flash point	Not applicable, steels are an inorganic solid with a high melting point >1000 °C
Flammability	Non flammable
Explosive properties	Non explosive
Oxidising properties	No
Viscosity	Solid

10. Stability and reactivity

The product is stable under normal conditions. When heated to high temperatures (>1000°C) it may give rise to fumes (iron oxide, nickel, chromium compounds and cobalt). In contact with strong acids, stainless steels may release gaseous acid decomposition products (e.g. hydrogen, oxides of nitrogen) and chromium may be released in the form of chromium III. In contact with strong oxidizers at high pH (e.g. alkaline cleaners at pH 10-14), Cr (IV) compounds may form at ambient temperatures.

11. Toxicological information

Under the general applications of this product health effects should not occur due to the low risk of exposure to minimal hazard material. If the following activities are carried out, mechanical working, such as dry grinding or machining or hot work such as welding and burning, dust / fume will be produced which may contain components at sufficiently high enough concentrations to cause health effects. The principal route of entry into the body is via inhalation as fume/dust.

Acute toxicity

Excessive fume/dust may cause irritation and can be potentially harmful if inhaled into the body in large amounts over long time periods. This is not expected under general use of the product.

Skin corrosion / irritation

The potential fumes/dust arising is not known to be an irritant.

Eye damage / irritation

The potential fumes/dust arising is not known to be an irritant.

Respiratory / Skin sensitisation

The potential fumes/dust arising is potentially known to cause sensitisation due to the presence of Nickel above 0.1%. Skin Sens. 1 H317: May cause an allergic skin reaction (Nickel). 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). 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.

Germ cell mutagenicity

No effect.

Carcinogenicity

Nickel is classified as Carc.2 suspected of causing cancer if present above 0.1%. IARC (International Agency for Research on Cancer) has concluded that stainless steel implants are not classifiable as to their carcinogenicity to humans.



Reproductive toxicity

No effect.

Repeated dose toxicity - Inhalation

Exposure to iron oxide fume, in excessive concentrations and over long periods of time, may cause a benign condition called siderosis. Repeated inhalation could lead to cumulative effects. This condition is not expected under general use of the product. Repeated exposure to dusts and or fumes containing Nickel above 0.1% increases the risk of damage to the respiratory system. However, a 28-day repeated inhalation study with stainless steel clearly indicates a lack of toxicity (i.e. no adverse effects were seen, even at the highest concentration of stainless steel), whereas the lowest nickel dose (0.004 mg/L) resulted in clear signs of toxicity in a 28-day nickel inhalation study.

12. Ecological information

There are no known harmful effects from the product to the environment. Under general application exposure to the environment should not occur.

12.1 Toxicity

No effect.

12.2 Persistence and Degradability

No effect.

12.3 Bioaccumulative potential

No effect.

12.4 Mobility in soil

No effect.

12.5 Results of PBT and vPvB assessment

Stainless Steels are not PBT or vPvB.

13. Disposal considerations

Steel products are 100% recyclable and should be recycled at "end of life" in all situations.

14. Transport information

Stainless Steels are not classified as dangerous under CLP or Dangerous Substances Directive for transport so there is no requirement for transport information. All subheadings in this section are not applicable for this product.

15. Regulatory information

15.1

Stainless Steel specifications are covered by numerous ISO standards. All steels covered by this safety data sheet comply with the packaging and packaging waste EC Directive 94/62/EEC on heavy metal content, the Restriction of Hazardous substances directive 2002/95/EC and the End of Life Vehicle directive 2000/53/EC. The iron manufactured and used to produce this steel product has been registered under REACH along with any other component where a registration was required.

15.2

A Chemical Safety Assessment has not been carried out as Stainless Steels are defined as articles under REACH and does not require an assessment, plus it is not classified as dangerous under the CLP Regulations (EC)1272/2008 and or the Dangerous Substances Directive (67/548/EEC).

16. Other Information

Revision

This safety data sheet (SDS) has been produced / revised in line with Annex II of the REACH Regulations (2006) as guidance only, as articles do not require a SDS. Information in this safety data sheet is supplied to inform the customer and should be used where necessary.

This revision is the current version dated **August 2012**

Previous Versions: None



Risk and Safety Phrases according to (67/548/EEC):

- R40. Limited evidence of a carcinogenic effect
- R43. May cause sensitisation by skin contact
- R42/43. May cause sensitisation by inhalation and skin contact
- R48/23. Toxic: danger of serious damage to health by prolonged exposure through inhalation
- R53. May cause long-term adverse effects in the aquatic environment

Hazard and Precautionary Statements according to CLP Regulations (EC)1272/2008):

- H317. May cause an allergic skin reaction
- H334. May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H351. Suspected of causing cancer, inhalation
- H372. Causes damage to the respiratory tract
- H413. May cause long lasting harmful effects to aquatic life

References

GESTIS International Limit Values Institut fuer Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA) – website:

http://www.dguv.de/ifa/en/gestis/limit_values/index.jsp

EH40 Workplace Exposure Limits, 2005 as amended (2012) – HSE UK

ECHA Website – Nickel, Cobalt

Disclaimer

The information, specifications, procedures, and recommendations herein are presented in good faith and are believed to be accurate and reliable at the date of issue. Where information is taken from supplied items it is the responsibility of the supplier to ensure the accuracy of the data. The individual authors of this safety sheet are deemed to be appropriately competent. This safety data sheet was constructed using the guidance provided under the REACH regulations ((EC) No 1907/2006) as to the format and information required. For steel articles a safety data sheet is not a legal requirement and is provided for the convenience of downstream users. Occupational exposure limits (OEL) used in this safety data sheet will be EU OELs and where these limits do not exist UK OELs will be the reference limit. No liability can be accepted with regard to the handling, processing or use of the product concerned which, in all cases, shall be in accordance with appropriate regulations and or legislation. Tata Steel Europe gives no warranty or representation as to the accuracy of the information or for the guidance being for, or suitable for, a specific purpose. All implied warranties and conditions are excluded, to the maximum extent permitted by law. Use of this document by any third party is at your own risk. Save to the extent that liability cannot be excluded by law, Tata Steel Europe is in no way responsible or liable for any damage or loss whatsoever arising from the use of or reliance on the information and guidance contained in this document.