

Stainless Steel	Safety Data Sheet	
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1. Identification

GHS Product Identifier: Stainless Steel



Other Means of Identification: Ingot, Electrode, Billet

Recommended use and restrictions:

Manufacture of various articles

2. Hazard Identification

Classification: Stainless steel is considered an article and not hazardous in its solid form. However, certain processes such as cutting, milling, grinding, melting, and welding could result in some hazardous materials being emitted. The following information is for the hazardous elements which may be emitted during these processes.

Symbols	HAZARD	GHS CLASSIFICATION	HAZARD STATEMENTS
	Carcinogenicity	Category-1B	May cause cancer
	Respiratory Sensitizer	Category -1	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
	STOT (repeated exposure)	Category -1	Causes damage to organs through prolonged or repeated exposure.
	Toxic to Reproduction	Category – 1B	Suspected of damaging the unborn child
	Acute Oral Toxicity	Category- 4	Harmful if swallowed
	Skin Sensitizer	Category- 1	May cause allergic skin reaction
	STOT (single exposure)	Category- 3	May cause respiratory irritation
	Eye Irritation	Category- 2B	Causes eye irritations.

Precautionary Statements:

PREVENTION	FIRST AID RESPONSE
<p>Do not breathe dust/fume/gas/vapor/spray.</p> <p>Use in well ventilated area.</p> <p>Wash thoroughly after handling.</p> <p>Do not eat, drink, or smoke when handling this product.</p> <p>Do not handle until all safety precautions have been read and understood.</p> <p>Contaminated work clothing should not be allowed out of the workplace.</p>	<p>Eyes: Flush eyes with plenty of water for at least 15 min. Seek medical attention if eye irritation persists.</p> <p>Skin: Wash affected area with mild soap and water. Seek medical attention if skin irritation persists.</p> <p>Inhalation: Remove to fresh air. Check for clear airway, breathing and presence of pulse. If necessary administer CPR. Consult a physician immediately.</p> <p>Ingestion: Dust may irritate mouth and gastrointestinal tract. If ingested, seek medical attention promptly.</p>
STORAGE	DISPOSAL
<p>Store away from acids and incompatible materials</p> <p>Store in accordance with federal/provincial/state or local regulations</p>	<p>Steel scrap should be recycled whenever possible</p> <p>Otherwise, dispose of in accordance with applicable federal/provincial/state/ or local regulations</p>

3. Composition/Information on Ingredients

All values are expressed as weight percent and are approximate. The percent composition reflects the range that is possible within this group of products. These are not the technical specifications for particular product. All grades do not include all hazardous ingredients.

COMPONENT	CAS NUMBER	PERCENT
Iron	7439-89-6	30-90
Nickel	7440-02-2	0-40
Chromium	7440-47-3	9.5-30
Manganese	7439-96-5	0-15
Molybdenum	7429-98-7	0-6
Copper	7440-50-8	0-5
Silicon	7440-21-3	0-3
Aluminum	7429-90-5	0-3
Cobalt	7440-48-4	0-10
Titanium	7440-32-6	0-3
Vanadium	1314-62-1	0-5
Tungsten	7440-33-7	0-5
Carbon	7440-44-0	0-1.5
Sulfur (as SO ₂)	7446-09-5	0-0.5

Niobium (Columbium)	7440-03-1	0-5
Tantalum	7440-25-7	0-5
Lead	7439-92-1	Trace

4. First Aid Measures

Eye Contact: Wash with copious amounts of water for 15 minutes to ensure that no articles remain in the eye. Seek medical advice if irritation persists.

Skin Contact: If irritation develops, wash skin thoroughly with soap and water. Seek medical attention if necessary.

Inhalation: Remove from dusty area to fresh air. If discomfort persists, consult physician.

Most Important symptoms/Effects, Acute and Delayed:

Stainless steel as a solid and shipped is not likely to present an acute or chronic health effects. However, during processing (cutting, milling, grinding, melting, or welding) emitted byproducts may cause irritations, difficulty in breathing, coughing or wheezing. Material may cause allergic skin reaction.

Indication of Immediate Medical Attention and Special Treatment, If Necessary:

Notes to physician: May cause sensitization by skin contact or inhalation. Treat symptomatically.

5. Fire Fighting Measures

Suitable Extinguishing Media: Non-flammable. Material will not support combustion. This section is not applicable for solid product. Use extinguishers appropriate for surrounding materials. Do not use water on molten metal. A fire involving finely divided alloy should be treated as Class D Combustible metal fire.

Specific Hazards Arising From Materials:

This is not applicable for solid product.

Hazardous Combustion Products: This is not applicable for solid product. Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided alloy.

Special Fire Fighting Instructions: For solid formed alloy, as appropriate for surrounding fire. Firefighters should wear self-contained NIOSH-approved breathing apparatus and full protective clothing.

Explosion Data: Solid formed alloy does not constitute a fire or explosion hazard. However, finely divided suspended particles may present a fire and explosion hazard in the presence of an ignition source.

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures:

Not applicable to stainless steel in solid form. Avoid dust formation. Ensure adequate ventilation. Cleanup personnel should be protected against inhalation and eye and skin contact.

Environmental precautions: This section is not applicable to stainless steel in solid form.

Methods and Materials for Containment and Cleaning Up:

This section is not applicable to stainless steel in solid form. For spills involving fine dusts, remove by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid inhalation of dusts.

7. Handling and Storage

Precautions of Safe Handling: This section is not applicable to stainless steel in solid form. Operations with the potential for generating high concentrations of airborne particles should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust.

Conditions for Safe Storage: No special storage conditions for stainless steel in solid form.

Incompatible Products: Store away from acids and incompatible materials.

8. Exposure Controls/Personal Protection

Control Parameters: There are no exposure limits for stainless steel. The exposure limit for iron containing fumes has been established at 5mg/m³ with ACGIH's TWA. The individual complex compounds with the fume may have lower exposure limits than the general fume.

COMPONENT	CAS NUMBER	OSHA PEL (mg/m ³)	TLV ACGIH (mg/m ³)
Iron	7439-89-6	10 Iron Oxide- Fume	5 (Iron Oxide- Dust & Fume)
Nickel	7440-02-2	1 Metal, soluble & insoluble compounds	1.5 Metal, 0.1 Soluble compounds, 0.2 Insoluble compounds
Chromium	7440-47-3	1 Metal and insoluble salt, 0.5 Cr(III), 5µg/m ³ Cr(VI) 2.5µg/m ³ Action Level Cr(VI)	0.5 Metal and Cr(III), 0.05 Cr(VI) and water soluble compounds, 0.01 Cr(VI) Insoluble compounds
Manganese	7439-96-5	5 (ceiling)	0.2
Molybdenum	7429-98-7	5 Soluble compounds as Mo, 15 Total dust	5 Soluble compounds as Mo, 10 Insoluble compounds as Mo
Copper	7440-50-8	0.1 Fume, 1.0 Dust & Mist	0.2 Fume, 1.0 Dust & Mist
Silicon	7440-50-8	15 Total Dust, 5 Respirable dust	10 Total Dust
Aluminum	7429-90-5	15 Metal & Total dust, 5 Respirable dust	1 Respirable dust, 5 Welding fume
Cobalt	7440-48-4	0.1 Metal, Dust, & Fume	0.02 Metal, Dust, & Fume
Vanadium	1314-62-1	0.5 (ceiling) V ₂ O ₅ dust, 0.1 (ceiling) V ₂ O ₅ fume	0.05 V ₂ O ₅
Tungsten	7440-33-7	15 Total Dust, 5 Respirable Dust	1.0, 3 STEL Soluble, 5.0, 10 STEL Insoluble
Niobium (Columbium)	7440-03-1	No Exposure Limit Established	No Exposure Limit Established
Tantalum	7440-25-7	5 Metal & Oxide Dust 10 STEL	5 Metal & Oxide Dust
Carbon	7440-44-0	15 Total Dust, 5 Respirable Dust	-
Sulfur(as SO ₂)	7446-09-5	13	STEL 0.25PPM
Titanium	7440-32-6	15 TiO ₂ Total Dust	10 TiO ₂ Total Dust
Lead	7439-92-1	0.05	0.05

Note: OSHA PELs and Threshold Limit Values (TLV) established by the Occupational Health and Safety Administration and the American Conference of Governmental Industry Hygienists (ACGIH) are 8 hour Time Weighted Average concentrations unless otherwise noted.

Appropriate Engineering Controls: Local and or general exhaust ventilation should be used to keep worker exposure below applicable exposure limits during welding, brazing, grinding, machining, and other process which may generate airborne contaminants.

Individual Protective Measures: Dependent upon process being performed on material each operation must be addressed for suitable equipment.

Gloves: Suitable for protection against physical injury and skin contact during handling and processing.

Eyes: Safety glasses or goggles should be worn when there is probability of flying particles or elevated levels of dust or fume.

Clothing: N/A

Respirator: If concentrations exceed established limits use NIOSH/MSHA approved particulate respirators (dust & fume or high efficiency dust and fume) when grinding or welding.

Footwear: N/A

Other: N/A

9. Chemical and Physical Properties

Physical State	Solid	Appearance	Solid silver-gray metallic
Odor	Odorless	Odor Threshold	Not Applicable
pH	Not Applicable	Melting Point	2300°F-2800°F
Boiling Point	Not Applicable	Flash Point	Not Applicable
Evaporation Rate	Not Applicable	Flammability	Not Flammable
Upper Flammability Limit	Not Applicable	Lower Flammability Limit	Not Applicable
Vapor Pressure	Not Applicable	Vapor Density	Not Applicable
Relative Density	Not Applicable	Specific gravity	7.6 – 8.0
Solubility	Not Applicable	Partition Coefficient	No Data
Auto-Ignition	Not Applicable	Decomposition Temperature	No Data
Viscosity	Not Applicable		
Other Information	Not Applicable		

10. Stability and Reactivity

Reactivity: Not determined for product in solid form

Chemical Stability: Stable under normal conditions of transport, storage and use for solid formed product.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Contact with mineral acids will release flammable hydrogen gas. Dust formation.

Incompatible Materials: Oxidizers, Reacts with strong acids to form explosive hydrogen gas.

Hazardous Decomposition Products: During certain operations such as welding, burning, melting, or hot rolling, metal fumes may be generated. Hexavalent chromium which is a suspect carcinogen may result from pickling stainless.

11. Toxicological Information

Toxicity

Component	LD ₅₀ Oral	LD ₅₀ Dermal	LD ₅₀ Inhalation	Other
Iron	30,000 mg/kg Oral-Rat	-	-	-
Nickel	>9,000 mg/kg Oral-Rat	-	-	-
Chromium	No data available	-	-	-
Manganese	9000mg/kg Oral-Rat	-	-	-
Molybdenum	No data available	-	-	-
Copper	No data available	-	-	-
Silicon	3,160 mg/kg	-	-	-
Aluminum	No data available	-	-	-
Cobalt	6,171 mg/kg Oral-Rat	-	-	-

Likely Routes of Entry: None for stainless steel in its solid form.

- Eyes:** High concentration of dust may cause irritation to the eyes
- Skin:** Prolonged skin contact with dust may cause skin irritation to sensitive individuals
- Inhalation:** Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, or grinding machining may pose acute or chronic health effects.

Symptoms Related to the Physical, Chemical, and Toxicological Characteristics:

None for stainless steel in its natural solid shape

Effects of Acute Exposure to Material:

Manganese & Copper: Inhalation over exposure to manganese or copper (or zinc coated products) may cause metal fume fever characterized by fever and chills (flu like symptoms) which appear 4-6 hours after exposure with no long term effects.

Effects of Chronic Exposure to Material:

Chromium: IARC lists certain hexavalent chromium compounds under its Group 1 category "confirmed carcinogenicity to humans.", and metallic chromium under its group 3 category "not classifiable as to their carcinogenicity to humans." Chromium metal is classified as a carcinogenic by NTP.

Nickel: IARC lists metallic nickel under its Group 2B category "possibly carcinogenic to humans."

Cobalt: Cobalt dust may result in asthma like conditions (cough, shortness of breath). IARC lists metallic cobalt under its Group 2B category “possibly carcinogenic to humans.”

Copper: Copper fumes may result in Wilson’s disease (characterized by hepatic cirrhosis, brain damage, demyelination, renal disease, and copper deposition in the cornea.

Iron: Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with a few or no symptoms.

Manganese: Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson’s disease, metal fume fever and kidney damage.

STOT (Single Exposure):	No Data		
STOT (Repeated Exposure):	Respiratory system. Allergic skin reactions.		
Mutagenicity of Material:	N/A		
Reproductive Effects:	N/A		
Teratogenicity of Material:	N/A		
Carcinogenicity of Material:	Chromium: IARC lists certain hexavalent chromium compounds under its Group 1 category “confirmed carcinogenicity to humans,” and metallic chromium under its Group 3 category “not classifiable as to their carcinogenicity to humans.” Chromium metal is classified as a carcinogenic by NTP. Nickel: IARC lists metallic nickel under its Group 2B category “possibly carcinogenic to humans.” Cobalt: IARC lists metallic cobalt under its Group 2B category “possibly carcinogenic to humans.”		
Synergistic Materials:	N/A		
Aspiration Hazard:	No Data		
Sensitization of Material:	N/A		
LD₅₀ (of Material):	Not established	LC₅₀ (of Material)	Not established

Notes:

- STOT- Specific Target Organ Toxicity
- IARC- International Agency for Research on Cancer Summaries and Evaluation (2008)

- Third Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP) Iron containing welding fume has an exposure limit of 5mg/m³ (ACGIH-TLV'S 2011), welding fume may also contain contaminants from fluxes or welding consumables. Prolonged skin contact may cause reddening and drying of skin or dermatitis in sensitive individuals due to nickel and/or chromium content in steel.

12. Ecological Information

Ecotoxicity: No Data available in stainless steel in its solid form. However, individual components of the material have been found to be toxic to the environment.

Component	Toxicity to Fish	Toxicity to Algae	Toxicity to Microorganisms
Iron	LC ₅₀ Common Carp 96 hr. 0.56 mg/l	-	-
Chromium	LC ₅₀ Fathead minnow 96 hr. 10-100 mg/l	-	-
Nickel	LC ₅₀ Common Carp 96 hr. 1.3 mg/l	EC ₅₀ Freshwater Algae 72hr. 0.18 mg/l	EC ₅₀ Water Flea 48hr. 1.0 mg/l

Persistence and Degradability: No data available

Bioaccumulative Potential: No data available

Mobility in Soil: No data available for stainless steel in its solid form. Individual metal dusts may migrate into soil and groundwater and be absorbed by plants.

Other Adverse Effects: None known.

13. Disposal Considerations

Waste Disposal Methods: Steel scrap should be recycled whenever possible.

Container Cleaning and Disposal: Dispose of in accordance with the applicable federal, provincial/state, or local regulations.

14. Transportation Information

General Shipping Information: Stainless steel is not regulated for shipping.

Shipping Name & Description: N/A

UN Number: N/A

Hazard Class: N/A

Packing Group/Risk Group: N/A

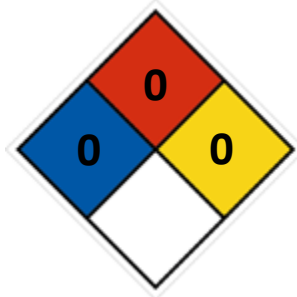
16. Other Information

Stainless Steel

Hazard Label Rating Systems:

National Fire Protection Code:

NFPA H=0 F=0 R=0



Hazardous Materials Identification System:

HMIS Code: H=1* F=0 R=0 PPE: See Section 8

*Denotes possible chronic hazard if airborne dusts or fumes are generated.

Health	1*
Flammability	0
Reactivity	0
Other	

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