1. Identification

Product Identifier: **Stainless Steel Products (Types 304 and 316)**

Manufacturer:
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Telephone Numbers
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Recommended use: Various stainless steel products for masonry construction.

Recommended restrictions: None known.

2. Hazards Identification

Description of hazards

Dust and fumes may be generated during working, e.g. during welding, cutting or grinding. Long term over-exposure to air pollutants in the form of dust or fumes may affect health and cause, for instance, chronic bronchitis.

A thin coat of anti-corrosion oil is applied to certain materials. This should be taken into account during handling and working. Heating and working of materials that have been coated with anti-corrosion oil may cause irritating and hygienically harmful fumes. Skin irritation may be caused by repeated or extended contact with anti-corrosion oil.

3. Composition/Information on Ingredients

Material/Component	CAS Number	% Weight TYPE 304	TYPE 316
Alloying Elements			
Carbon (C)	7440-44-0	0.08 max	0.08 max
Manganese (Mn)	7439-96-5	2.0 max	2.0 max
Phosphorous (P)	7723-14-0	0.045 max	0.045 max
Sulfur (S)	7704-34-9	0.030 max	0.030 max
Silicon (Si)	7440-21-3	2.0 max	0.75 max
Chromium (Cr)	7440-47-3	18.0-20.0	18.0-20.0
Nickel (Ni)	7440-02-0	8.0-12.0	8.0-12.0
Molybdenum (Mo)	7439-98-7	0.0	2.0-3.0
Nitrogen (N)	7727-37-9	0.10 max	0.10 max
Base Metal			
Iron (Fe)	7439-89-6	Balance	Balance

NOTE: The above listing is a summary of elements used to alloy stainless steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

4. First-Aid Measures

Description of Necessary Frst Aid Measures:

Eye contact: flush eyes with plenty of water for at least 15 minutes. seek medical attention if eye irritation persists.

Skin contact: maintain good personal hygiene. wash affected area with mild soap and water. seek medical attention if skin irritation persists.

Inhalation: remove to fresh air. check for clear airway, breathing and presence of pulse. If necessary administer CPR. Consult a physician immediately.

Ingestion: Rare in industry. dust may irritate mouth and gastrointestinal tract. If ingested, seek medical attention promptly.

Most important symptoms/effects, acute and delayed:

Stainless steel as sold 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. may cause allergic skin reactions. Indication of immediate medical attention and special treatment needed, if necessary:

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

5. Fire-fighting measures

SUITABLE EXTINGUISHING MEDIA: Non-flammable. Will not support combustion. Not applicable for solid product. Use extinguishers appropriate for surrounding materials.
Do not use water on molten metal.
SPECIFIC HAZARDS ARISING FROM MATERIAL: Not applicable for solid product.
HAZARDOUS COMBUSTION PRODUCTS: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated.
SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS:
Firefighters should wear self-contained NIOSH-approved breathing apparatus and full protective clothing.
EXPLOSION DATA:
SENSITIVITY TO MECHANICAL IMPACT: None.
SENSITIVITY TO STATIC DISCHARGE: N/A

6. Accidental release measures

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:
Not applicable to stainless steel in solid state. Avoid dust formation. Ensure adequate ventilation. Clean-up personnel should be protected against contact with eyes and skin protection.
ENVIRONMENTAL PRECAUTIONS: Not applicable to stainless steel in solid state.
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP:
Not applicable to stainless steel in solid state. 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 FOR SAFE HANDLING: Not applicable to stainless steel in solid state. Operations with the potential for generating high concentrations of airborne particulates 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 state.
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 5 mg/m3 with ACGIH's TWA. The individual complex compounds within the fume may have lower exposure limits than the general fume.

Material/Component	CAS Number	Exposure Limits OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)
Alloying Elements			
Carbon (C)	7440-44-0	None Listed	None Listed
Manganese (Mn)	7439-96-5	5.0 as Mn	1.0 as Mn
Phosphorous (P)	7723-14-0	0.1 as P	0.1 as P
Sulfur (S)	7704-34-9	13 (Sulfur Dioxide)	5 (Sulfur Dioxide)
Silicon (Si)	7440-21-3	None Listed	None Listed
Chromium (Cr)	7440-47-3	1.0 as Cr	0.5 as Cr
Nickel (Ni)	7440-02-0	1.0 as Ni	1.0 as Ni
Molybdenum (Mo)	7439-98-7	5.0 Sol. Cmpds	5.0 Sol. Cmpds
Nitrogen (N)	7727-37-9	None Listed	Simple Asphyxiant
Base Metal			
Iron (Fe)	7439-89-6	(Fe_2O_3 Fume)	5 (Fe_2O_3 Fume)

Notes:
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH 2011) are 8-hour Time Weighted Average concentrations unless otherwise noted.

APPROPRIATE ENGINEERING CONTROLS: Provide general or local exhaust to minimize airborne concentrations during milling, grinding, melting and welding operations.
INDIVDUALAL PROTECTIVE MEASURES: Dependent upon process being performed on material each operation must be addressed for suitable equipment.
GLOVES (Specify): Wear gloves as required EYES (Specify): Safety glasses or goggles as required.
CLOTHING (Specify): N/A FOOTWEAR (Specify): N/A

RESPIRATOR (Specify): If concentrations exceed established limits use NIOSH/MSHA approved particulate respirators (dust & fume or high efficiency dust fume) when grinding or welding.
OTHER (Specify): N/A

9. Physical and chemical properties

PHYSICAL STATE: Solid
APPEARANCE: Silver Grey Metallic (Steel)
ODOR: Not Applicable
ODOR THRESHOLD: Not Applicable
pH: Not Applicable
MELTING POINT: 1530°C (2786°F)
BOILING POINT: Not Applicable
FLASH POINT (ºC): N/A
EVAPORATION RATE: Not Applicable
FLAMMIBILITY (solid, Gas): Not flammable
UPPER FLAMMABLE LIMIT %: Not Applicable
LOWER FLAMMABLE LIMIT %: Not Applicable
VAPOUR PRESSURE: Not Applicable
VAPOUR DENSITY: Not Applicable
RELATIVE DENSITY: 7.86
SPECIFIC GRAVITY: No data
SOLUBILITY: Not soluble
PARTITION COEFFICIENT: No data
AUTO-IGNITION TEMP (ºC): 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: Yes. Steel products are stable under normal storage and handling conditions.
POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization cannot occur.
CONDITIONS TO AVOID: Contact with mineral acids will release flammable hydrogen gas. Dust formation.
INCOMPATIBLE MATERIALS: Yes, strong acids.
HAZARDOUS DECOMPOSITION PRODUCTS: Not Applicable.

11. Toxilogical information

LIKELY ROUTES OF ENTRY: None for stainless steel in its natural solid state.
EYES: High concentrations of dust may cause irritation to the eyes.
SKIN: Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals.
INHALATION: Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or 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 state.
EFFECTS OF ACUTE EXPOSURE TO MATERIAL: MANGANESE & COPPER: Inhalation overexposure to manganese or copper (or zinc coated products) may cause metal fume fever characterized by fever and chills (i.e. 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 human carcinogens” and metallic chromium under its Group 3 category - “not classifiable as to their carcinogenicity to humans”. Chromium metal is classified as carcinogenic by NTP.
NICKEL: IARC lists metallic nickel under its Group 2B category - “possibly carcinogenic to humans”. Nickel may cause skin sensitivity
COBALT: Cobalt dust may result in an asthma-like condition (cough, shortness of breath). IARC lists metallic cobalt under its Group 2B category - “possibly carcinogenic to humans”.
IRON: Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with 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 Exposures): Respiratory system. Allergic skin reactions.
MUTAGENCITY 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 human carcinogens” and metallic chromium under its Group 3 category - “not classifiable as to their carcinogenicity to humans”.
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
- International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008).
- 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP).
- Iron containing welding fume has an exposure limit of 5 mg/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 for the stainless steel in its natural solid state. 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	LC50 Common Carp 96 hr.0.56 mg/l	-	-
Chromium	LC50 Fathead minnow 96 hr. 10-100 mg/l	-	-
Nickel	LC50 Common Carp 96 hr. 1.3 mg/l	EC50 Freshwater Algae 72 hr. 0.18 mg/l	EC50 Water Flea 48 hr. 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 natural solid state. 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 & DISPOSAL: Dispose of in accordance with applicable federal, provincial/state or local regulations.

14. Transport information

GENERAL SHIPPING INFORMATION: Stainless steel not regulated for shipping.
SHIPPING NAME AND DESCRIPTION: N/A
UN NUMBER: N/A
HAZARD CLASS: N/A
PACKING GROUP/RISK GROUP: N/A
TRANSPORT REGULATIONS:
Canadian Transportation of Dangerous Goods Regulations (TDG) March 2011.
US Department of Transport (DOT) Hazardous Materials shipping information (Title 49 - Transportation March 2011).

15. Regulatory Information

REGULATORY INFORMATION: The following listing of regulations relating to a Russel Metals Inc. product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.
ADDITIONAL CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Class D2A/D2B: Materials Causing Other Toxic Effects.
DOMESTIC SUBSTANCES LIST: The components of this material are on the federal DSL Inventory.
OTHER CANADIAN REGULATIONS: N/A
ADDITIONAL U.S. REGULATIONS:
SARA: The components of this material are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA – Oct. 2006).
SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.
TSCA INVENTORY STATUS: The components of this material are listed on the Toxic Substances Control Act Inventory.
CERCLA REPORTABLE QUANTITY (RQ): RQ's for Hazardous Substances in the Comprehensive Environmental Response, Compensation, and Liability Act are: Chromium = 5000 lb. (2270 kg); Copper = 5000 lb. (2270 kg); Nickel = 100 lb. (45 kg).
CALIFORNIA (PROPOSITION 65): The Chromium (VI) component of this material is known in the State of California to cause cancer.
The Nickel component of this material is known in the State of California to cause cancer.
The Cobalt component of this material is known in the State of California to cause cancer.
OTHER U.S. FEDERAL REGULATIONS: N/A.

ADDITIONAL EUROPEAN UNION REGULATIONS:

RoHS & WEEE: This MSDS follows the European Union Directive “Restriction on the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment” (2002/95/EC) and the “Waste Electrical and Electronic Equipment (WEEE)” Directive (2002/96/EC).

Lead (Pb): Lead is not intentionally added to stainless steel however, it may exist in trace levels. Although not analyzed, lead levels in steel are typically well below the EU Directive limit of 0.1%. Note, the EU Directive has a lead exemption limit of up to 0.35% as an alloying element in steel.

Chromium VI (Cr +6): The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

16. Other information

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