


SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE MATERIAL NAME: STAINLESS STEEL SYNONYMS: Includes all Sheet products, Plate, Strip, Bar, Slab, Ingot, Structural shapes and Tubular Products.		SUPPLIER: RUSSEL METALS INC. ADDRESS: 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: MSDS-04-2019. DATE: APRIL 15, 2019
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1. IDENTIFICATION

GHS PRODUCT IDENTIFIER:	STAINLESS STEEL
OTHER MEANS OF IDENTIFICATION:	Includes all Sheet products, Plate, Strip, Bar, Slab, Ingot, Structural shapes and Tubular Products
RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS ON USE:	Solid stainless steel products, various forms and uses. Manufacture of articles.
SUPPLIER'S DETAILS:	RUSSEL METALS INC., 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6
EMERGENCY PHONE NUMBER:	905-819-7295

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Stainless Steel is considered an "article" and not hazardous in its solid form. However, certain process such as cutting, milling, grinding, melting and welding could result in some hazardous materials being emitted. The GHS Classification below pertains to these emitted products during these processes.

SIGNAL WORD, HAZARD STATEMENTS & SYMBOLS: DANGER

SYMBOLS	HAZARD	GHS CLASSIFICATION	HAZARD STATEMENTS
	Carcinogenicity Respiratory Sensitizer STOT (repeated exposure)	Category – 1B Category – 1 Category – 1	May cause cancer May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs through prolonged or repeated exposure.
	Acute Oral Toxicity Skin Sensitizer STOT (single exposure)	Category – 4 Category – 1 Category – 3	Harmful if swallowed. May cause allergic skin reaction. May cause respiratory irritation.
N/A	Eye Irritation	Category – 2B	Causes eye irritations.

PRECAUTIONARY STATEMENTS:

PREVENTION	FIRST AID RESPONSE
Do not breathe dust/fume/gas/vapour/spray. Use in a well-ventilated area. Use personal protective equipment as required. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read & understood. Contaminated work clothing should not be allowed out of the workplace.	EYES: Flush eyes with plenty of water for at least 15 minutes. Seek medical attention if eye irritation persists. SKIN: 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: Dust may irritate mouth and gastrointestinal tract. If ingested, seek medical attention promptly.
STORAGE	DISPOSAL
Store away from acids and incompatible materials. Store in accordance with federal/ provincial/state or local regulations.	Steel scrap should be recycled whenever possible. Otherwise, dispose of in accordance with applicable federal/ provincial/state or local regulations.

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): Not applicable.

NOTES:

- STOT – Specific Target Organ Toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

BASE METAL

(ALL VALUES ARE EXPRESSED AS WEIGHT PERCENT AND ARE APPROXIMATES)

CHEMICAL NAME	CAS NUMBER	ELECTRIC ALLOY STEEL	TOOL STEELS	300/400 SERIES STAINLESS STEEL
Iron	7439-89-6	95	90	80
Chromium	7440-47-3	5	25	30
Nickel	7440-02-0	5	5	35
Molybdenum	7439-98-7	2	5	6
Vanadium	7440-62-2	2	5	--
Cobalt	7440-48-4	0.75	8	1
Manganese	7439-96-5	--	--	2.5
Aluminum	7429-90-5	1.5	--	--
Silicon	7440-21-3	2	2.5	--
Copper	7440-50-8	--	--	5

NOTES:

- For exact composition, refer to analysis or specifications.

NON-METALLIC COATINGS

DRY-LUBE	Mixture of Borate and Carbonate Soap lubricants for metal forming.	SLUSHING OIL	Protective coatings containing small quantities of anti-oxidants.
PRE-LUBE	Petroleum based oil coating used for metal forming.	VANISHING OIL	Solvent applied petroleum oil protective coating leaving a wax-like protective coating.
LUBE-OIL	Lubricating protective petroleum based oil.		

NOTE: Individual coating components are present at values below the reporting requirements of the WHMIS Ingredient Disclosure List.

4. FIRST AID MEASURES

DESCRIPTION OF NECESSARY FIRST 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.

CHEMICAL NAME	CAS NUMBER	TLV ACGIH (mg/m ³)	OSHA PEL (mg/m ³)	MOL TWA (mg/m ³)
Iron (as oxide)	7439-89-6	5.0 (Respirable)	10.0 (Fume)	5.0 (Respirable)
Chromium	7440-47-3	0.5 (Inhalable) Metallic Chromium 0.003 (Inhalable) Cr (III) 0.0002 (Inhalable) Cr(VI) soluble 0.0005 (Inhalable) Cr(VI) soluble - STEL	1.0 (metal)	0.5 (Metal and Cr (III)) 0.05 (Soluble Cr VI) 0.01 (Insoluble Cr VI)
Nickel	7440-02-0	1.5 (Inhalable) Elemental 0.2 (Inhalable Insoluble) 0.1 (Inhalable Soluble)	1.0 (Insoluble) 1.0 (Soluble)	1.0 (Inhalable) Elemental 0.2 (Inhalable Insoluble) 0.1 (Inhalable Soluble)
Molybdenum	7439-98-7	10.0 (Inhalable) Insoluble 3.0 (Respirable) Insoluble 0.5 (Respirable) Soluble	15.0 (Dust, Insoluble) 5.0 (Soluble)	10.0 (Inhalable) Metal & Insoluble 3.0 (Respirable) Metal & Insoluble 0.5 (Respirable) Soluble
Vanadium	7440-62-2	0.05 (as V ₂ O ₅)	0.5 (Dust as V ₂ O ₅) Ceiling 0.1 (Fume as V ₂ O ₅) Ceiling	0.05 (as V ₂ O ₅)
Cobalt	7440-48-4	0.02 (Metal, dust or fume)	0.1 (Metal, dust or fume)	0.02 (and inorganic compounds, as Co)
Manganese	7439-96-5	0.02 (Respirable Mn) 0.1 (Inhalable) for elemental and inorganic compounds	5.0 (Fume Ceiling) 5.0 (Mn compounds Ceiling)	0.2 (for elemental and inorganic compounds)
Aluminum	7429-90-5	1.0 (Respirable) Metal	15.0 (Dust) 5.0 (Respirable)	1.0 (Respirable)) Metal & Insoluble
Silicon	7440-21-3	10.0 (Inhalable) as nuisance dust 3.0 (Respirable)	15.0 (Dust) 5.0 (Respirable)	10.0 (Inhalable) as nuisance dust 3.0 (Respirable)
Copper	7440-50-8	1.0 (Dust) 0.2 (Fume)	1.0 (Dust) 0.1 (Fume)	1.0 (Dust) 0.2 (Fume)

NOTES:

- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH - 2018) are 8-hour Time Weighted Average concentrations unless otherwise noted
- Permissible Exposure Limits (PEL) from Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1 Table (January 9, 2017)
- Time-Weighted Average (TWA) exposure values from Ontario's Ministry of Labour (MOL) Regulation 833 (latest update Jan., 2018). Where a value is not set out in the Ontario table, a listing on the 2015 ACGIH Table TLVs would apply

APPROPRIATE ENGINEERING CONTROLS:

Provide general or local exhaust to minimize airborne concentrations during milling, grinding, melting and welding operations.

INDIVIDUAL 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. CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE:	Solid	APPEARANCE:	Silver Grey Metallic (Steel)
ODOUR:	Not Applicable	ODOUR THRESHOLD:	Not Applicable
pH:	Not Applicable	MELTING POINT:	1530°C (2786°F)
BOILING POINT:	Not Applicable	FLASH POINT (°C):	N/A
EVAPORATION RATE:	Not Applicable	FLAMMABILITY (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 (°C):	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. TOXICOLOGICAL INFORMATION

TOXICITY:

COMPONENT	LD ₅₀ ORAL	LD ₅₀ DERMAL	LD ₅₀ INHALATION	OTHER
Iron	30,000 mg/kg Oral-Rat	-	-	-
Chromium	Unknown	-	-	-
Nickel	>9,000 mg/kg Oral-Rat	-	-	-
Molybdenum	Unknown	-	-	-
Vanadium	Unknown	-	-	-
Cobalt	6,171 mg/kg Oral-Rat	-	-	-
Manganese	9,000 mg/kg Oral-Rat	-	-	-
Aluminum	Unknown	-	-	-
Silicon	3,160 mg/kg Oral-Rat	-	-	-
Copper	Unknown	-	-	-

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:	<u>MANGANESE & COPPER:</u> 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:	<u>CHROMIUM:</u> 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. <u>NICKEL:</u> IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans" and Nickel compounds under its Group 1 category - "confirmed human carcinogens". Nickel may cause skin sensitivity. <u>COBALT:</u> 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". <u>IRON:</u> Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with few or no symptoms. <u>MANGANESE:</u> Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.
STOT (Single Exposure):	May cause respiratory irritation.
STOT (Repeated Exposures):	Respiratory system. Allergic skin reactions.
MUTAGENICITY OF MATERIAL:	N/A
REPRODUCTIVE EFFECTS:	N/A
TERATOGENICITY OF MATERIAL:	N/A
CARCINOGENICITY OF MATERIAL:	<u>CHROMIUM:</u> 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". <u>NICKEL:</u> IARC lists Nickel, metallic and alloys under its Group 2B category - "possibly carcinogenic to humans" and Nickel compounds under its Group 1 category - "confirmed human carcinogens".

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 (2019).
- 14th Annual Report on Carcinogens (2019) as prepared by the National Toxicology Program (NTP).
- Iron containing welding fume has an exposure limit of 5 mg/m³ (ACGIH-TLV's 2018). 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. TRANSPORTATION 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 2016.

US Department of Transport (DOT) Hazardous Materials shipping information (Title 49 - Transportation March 2017).

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), as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)	CERCLA Reportable Quantities
Aluminum	No	No	Yes	None listed
Chromium	No	No	Yes	5,000 lb.
Cobalt	No	No	Yes	None listed
Copper	No	No	Yes	5,000 lb.
Manganese	No	No	Yes	None listed
Nickel	No	No	Yes	100 lb.
Vanadium	No	No	No	None listed

SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this material. The default Federal

TSCA INVENTORY STATUS:
CERCLA REPORTABLE QUANTITY (RQ):
CALIFORNIA (PROPOSITION 65):

MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.
The components of this material are listed on the Toxic Substances Control Act Inventory.
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).
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 updated 2015) 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% (1,000 ppm).
Note, the EU Directive has a lead exemption limit of up to 0.35% as an alloying element in steel.

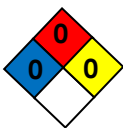
Chromium VI (Cr +6):

The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.
Hexavalent Chromium has EU Directive limit of 0.1% (1,000 ppm).

16. OTHER INFORMATION

STAINLESS STEEL

HAZARD LABEL RATING SYSTEMS:
NATIONAL FIRE PROTECTION CODE:
NFPA CODE: H=0 F=0 R=0



HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:
HMIS CODE: H=1* F=0 R=0 PPE: See Section 8

HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
OTHER	*

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

PREPARED BY: RUSSEL METALS INC. AND ENVIROTEST INC.

DATE: MAY, 2019

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NOTE: CONTACT SUPPLIER FOR ADDITIONAL PRODUCT INFORMATION

DISCLAIMER: THE INFORMATION CONTAINED HEREIN BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS OBTAINED FROM THE USE THEREOF.