

STEEL MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE MATERIAL NAME: STEEL SYNONYMS: Includes all Sheet products, Plate, Strip, Bar, Slab, Ingot, Structural shapes and Tubular Products. WHMIS CLASS: D2A, D2B		SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESOTA COURT, MISSISSAUGA, ONTARIO. CANADA. L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: MSDS-01-2011 DATE: NOVEMBER 2011
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1. PRODUCT INFORMATION

MATERIAL NAME: STEEL

FORM #: MSDS-01-2011

DATE: NOVEMBER 2011

MATERIAL USE: MANUFACTURE OF ARTICLES

2. HAZARDOUS INGREDIENTS

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

A Threshold Limit Value (TLV) has not been established for steel overall. The listing below is a summary of the elements used in the Russel Steel products. The exposure limit for iron-containing fumes has been established at 5 mg/m³ (as iron oxide - respirable) with ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general fume.

COMPONENT	C.A.S. NUMBER	TLV ACGIH (mg/m ³)	LD ₅₀	CARBON & H.S.L.A. STEELS	ELECTRICAL STEELS	LEADED & LOW ALLOY STEELS	RAILS & TIE PLATES	TUBULAR PROD.
IRON	7439-89-6	5.0 (as Iron Oxide - Respirable)	U	91-99	91-99	92-96	94-96	94-96
MANGANESE	7439-96-5	0.2 (as inorganic Mn)	9000 mg/kg Oral-Rat	<2.0	<2.2	<2.2	<1.7	<1.7
CHROMIUM	7440-47-3	0.5 (Metal & Cr+3) 0.05 (Cr +6 Soluble) 0.01 (Cr +6 Insoluble)	U	<0.1	<1.7	<1.7	<1.6	<0.7
NICKEL	7440-02-0	1.5 (Metal, Inhalable) 0.2 (Insoluble, Inhalable) 0.1 (Soluble, Inhalable)	>9000 mg/kg Oral-Rat	<1.0	<2.1	<2.1	<0.15	<0.5
COPPER	7440-50-8	1.0 (Dust) 0.2 (Fume)	U	<1.0	--	--	<0.1	<0.5
PHOSPHOROUS	7723-14-0	0.1 (Yellow)	U	<0.25	--	--	--	<0.1
MOLYBDENUM	7439-98-7	10.0 (Insoluble, Inhalable) 3.0 (Insoluble, Respirable) 0.5 (Soluble, Respirable)	U	--	--	--	<0.12	<1.0
LEAD	7439-92-1	0.05 (Elemental & Inorganic Compounds as Lead)	U	--	--	<0.35	--	--

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.
- Ingredients listed as required by the WHMIS Ingredient Disclosure List of the Hazardous Products Act (Canada).
- For exact composition, refer to analysis or specifications.

METALLIC AND NON-METALLIC COATINGS

GALVANIZE GALVANNEAL	- Hot dipped Zinc (CAS 7440-66-6) coating. Coating weights range from 15-400 g/m ² per side. May be chemically passivated with a Chromium compound which leaves a residual Cr level of 11-40 mg/m ² per side. Petroleum based rust preventative oils are applied to oiled product. Typical oil coating weights range from 1.1-5.4 g/m ² per side.	C2 COATING ELECTRICAL C3 COATING ELECTRICAL C5M COATING ELECTRICAL	- Glass film composed of Magnesium ortho-silicate formed during high temperature anneal - Oil modified polyester resin varnish film - An inorganic iron-silicate complex that is heat and oil resistant with good insulating properties.
GALVALUME	- Hot dipped Zinc (CAS 7440-66-6) 43% and Aluminum (CAS 7429-90-5) 55% coating. Coating weights range from 50-150 g/m ² per side. May also be passivated or oiled similar to Galvanize material.	DRY-LUBE PRE-LUBE LUBE OIL	- Mixture of borate and carbonate soap lubricants for metal forming. - Petroleum based oil coating used for metal forming - Lubricating protective petroleum based oil
TIN PLATE	- Electroplated with tin (CAS 7440-31-5) coating. Coating weights range from 0.9-15 g/m ² per side. Treated with Chromium passivation solution which leaves a Chromium residue of 0.05-7.5 g/m ² per side. May be coated with an edible oil to prevent scratching. Oil coating typically 0.1 micro inches thick.	SLUSHING OIL VANISHING OIL	- Mineral oil based protective coating containing small quantities of anti-oxidants - Solvent applied petroleum oil protective coating leaving a wax-like protective coating.

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			PRECOATED	- Cured paint/resin film applied to sheet steel. Galvanized or Galvalume coated steel sheet.
CHROMIUM	- Electroplated with Chromium (CAS 7440-47-3) coating. Coating weights range from 0.1-0.17 g/m ² per side. May be coated with edible oil similar to tin plate.		ZINCROMETAL	- Protective coating of zinc rich paint over a chromate based primer compound. Coating is applied to one side of strip. Typical coating weights range from 0.215 -0.325 g/m ²
RUST PROTECTION	- Oil based rust inhibitor (<i>Rust Ban 392</i>) containing 60-100% light hydrotreated distillates (CAS 64742-47-8).		PRIMER	- Standard Shop Primer Coating for steel (#27452 <i>Canam Grey</i>), based on 10-20% light aliphatic naphtha solvent (CAS 64742-89-8), 5-10% petroleum distillates (CAS 68410-16-2) and 5-10% Stoddard solvent (CAS 8052-41-3).

NOTES: 1. Individual coating components are present at values below the reporting requirements of the WHMIS Ingredient Disclosure List.
2. Passivation Treatment (specifically ordered) for Zinc Coated Products may contain hexavalent chromium as a portion of the chromium and chromium oxide corrosion protection coating. In these cases, the actual concentration of hexavalent present varies with steel gauge and coating weight.

3. HAZARDS IDENTIFICATION

ROUTES OF ENTRY: None in its natural solid state. This formed solid metal product poses little or no immediate health or fire hazard. When product is subjected to welding, burning, melting, sawing, brazing, grinding or other similar processes, potentially hazardous airborne particulate and fumes may be generated. High concentrations of dust may cause irritation to the eyes. Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

TARGET ORGANS: Respiratory system.

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".
IRON: Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with few or no symptoms.
LEAD: Chronic exposures may cause lead poisoning that can affect the digestive system, nervous system, reproductive systems, muscles and joints. IARC lists lead and its inorganic compounds under its Group 2B category - "possibly carcinogenic to humans".
MANGANESE: Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.
NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans". Nickel may cause skin sensitivity.

NOTES:

- International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008).
- 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP).

4. FIRST AID MEASURES

EYES: FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.
SEEK MEDICAL ATTENTION IF EYE IRRITATION PERSISTS.

SKIN: 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.

5. FIRE FIGHTING MEASURES

FLAMMABILITY CLASSIFICATION: Non-flammable. Will not support combustion.

MEANS OF EXTINCTION: Not applicable for solid product. Use extinguishers appropriate for surrounding materials.

FLASH POINT (°C): N/A **AUTO-IGNITION TEMP (°C):** N/A

UPPER FLAMMABLE LIMIT % BY VOL.: N/A **LOWER FLAMMABLE LIMIT % BY VOL.:** N/A

SENSITIVITY TO STATIC DISCHARGE: N/A **EXPLOSION DATA (SENSITIVITY TO IMPACT):** No

HAZARDOUS COMBUSTION PRODUCTS: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated.

UNUSUAL FIRE HAZARDS: None for this product. Do not use water on molten metal.

SPECIAL FIRE FIGHTING: None for this product.

6. ACCIDENTAL RELEASE MEASURES

LEAK AND SPILL PROCEDURES: Not applicable to 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.

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7. HANDLING AND STORAGE

HANDLING:	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.
STORAGE:	Store away from acids and incompatible materials.

8. EXPOSURE CONTROLS

ENGINEERING CONTROLS: (e.g. ventilation, enclosures, specify)	General or local exhaust during welding or grinding operations.		
PERSONAL PROTECTIVE EQUIPMENT:	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
BOILING POINT: Not Applicable	VAPOUR PRESSURE: Not Applicable	VAPOUR DENSITY: Not Applicable
MELTING POINT: 1530°C (2786°F)	DENSITY: 7.86	pH: Not Applicable
EVAPORATION RATE: Not Applicable	SOLUBILITY: Not Applicable	
COEFFICIENT WATER/OIL DISTRIBUTION:	Not Applicable	

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:	Yes. Steel products are stable under normal storage and handling conditions.
HAZARDOUS POLYMERIZATION:	Hazardous polymerization cannot occur.
INCOMPATIBILITY TO OTHER SUBSTANCES:	Yes
CONDITIONS OF REACTIVITY:	Contact with mineral acids will release flammable hydrogen gas.
HAZARDOUS DECOMPOSITION PRODUCTS:	N/A

11. TOXICOLOGICAL INFORMATION

IRRITANCY OF MATERIAL:	See Section 3.	SENSITIZATION OF MATERIAL: N/A
LD₅₀ (of Material):	Not established	LC₅₀ (of Material): Not established
MUTAGENICITY OF MATERIAL:	N/A	
REPRODUCTIVE EFFECTS:	N/A	
TERATOGENICITY OF MATERIAL:	N/A	
CARCINOGENICITY OF MATERIAL:	<p>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".</p> <p>NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans".</p> <p>LEAD: IARC lists lead and its inorganic compounds under its Group 2B category - "possibly carcinogenic to humans".</p>	
SYNERGISTIC MATERIALS:	N/A	
NOTE:	Iron containing welding fume has an exposure limit of 5 mg/m ³ (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 material as a whole. However, individual components of the material have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife.
ENVIRONMENTAL FATE:	No data available.
ENVIRONMENTAL DEGRADATION:	No data available.

13. DISPOSAL INFORMATION

WASTE DISPOSAL:	Steel scrap should be recycled whenever possible.
GENERAL INFORMATION:	Dispose of in accordance with applicable federal, provincial/state or local regulations.

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14. TRANSPORTATION INFORMATION

GENERAL SHIPPING INFORMATION: Material not regulated for shipping.

SHIPPING NAME AND DESCRIPTION: N/A
UN NUMBER: N/A
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), 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
Chromium	No	No	Yes	5,000 lbs
Copper	No	No	Yes	5,000 lbs
Lead	No	No	Yes	10 lbs
Manganese	No	No	Yes	None listed
Nickel	No	No	Yes	100 lbs
Phosphorus	Yes	Yes	Yes	1 lb.
Vanadium	No	No	No	None listed

SARA THRESHOLD PLANNING QUANTITY: Threshold Planning Quantities for Phosphorus is 100 lb. (45.4 kg), 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); Phosphorus 1 lb. (0.454 kg).
CALIFORNIA (PROPOSITION 65): The Chromium (VI) component of this material is known in the State of California to cause cancer. The Lead component of this material is known in the State of California to cause cancer, and/or birth defects (or other reproductive harm).
OTHER U.S. FEDERAL REGULATIONS: The Nickel component of this material is known in the State of California to cause cancer. Lead is regulated under 29 CFR 1910.1025.
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): The leaded low alloy steel has a lead content of <0.35%, which is above the EU Directive limit of 0.1%. Lead is not intentionally added to other steel alloys however, it may exist in trace levels.
Chromium VI (Cr +6): Note, the EU Directive has a lead exemption limit of up to 0.35% as an alloying element in steel. The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

16. OTHER INFORMATION

HAZARD LABEL RATING SYSTEMS:

NFPA CODE: H=0 F=0 R=0
HMIS CODE: H=1* F=0 R=0 PPE: See Section 8
 * Denotes possible chronic hazard if airborne dusts or fumes are generated.

PREPARED BY: RUSSEL METALS INC. AND ENVIROTEST INC. **DATE:** NOVEMBER 2011

TELEPHONE: 905-819-7295 **NOTE:** CONTACT SUPPLIER FOR ADDITIONAL PRODUCT INFORMATION

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