SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE		SUPPLIER: RUSSEL METALS INC.
MATERIAL NAME: **ALUMINUM ALLOYS** SERIES 1000, 2000, 3000, 5000, 6000 & 7000 SYNONYMS: Includes Sheet, Plate & etc.	Russel Metals	ADDRESS: 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: SDS-02-2014 DATE: AUGUST 2014

1. PRODUCT INFORMATION

GHS PRODUCT IDENTIFIER: **ALUMINUM ALLOYS**

OTHER MEANS OF IDENTIFICATION: Includes all aluminum and aluminum alloys

RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS ON USE:
Manufacture of articles.

SUPPLIER'S DETAILS: RUSSEL METALS INC., 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6

EMERGENCY PHONE NUMBER: 905-819-7295

2. HAZARDOUS INGREDIENTS

CLASSIFICATION: Aluminum and aluminum alloys are 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: WARNING

SYMBOLS	HAZARD	GHS CLASSIFICATION	HAZARD STATEMENTS
	Flammable Solid	Category – 1	Flammable Solid (in chips or powder form)
	Carcinogenicity Respiratory Sensitizer Toxic to Reproduction STOT (repeated exposure)	Category – 2 Category – 1 Category – 1B Category – 1	May cause cancer May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause genetic effects. Causes damage to organs through prolonged or repeated exposure.
	Skin Sensitizer STOT (single exposure)	Category – 1 Category – 1	May cause allergic skin reaction. May cause respiratory irritation.
	Acute Toxic to Aquatic Life Chronic Toxic to Aquatic Life	Category – 1 Category – 2	Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.
N/A	Eye Irritation	Category – 2B	Causes eye irritations.

PRECAUTIONARY STATEMENTS:

PREVENTION	FIRST AID RESPONSE	
Do not breathe dust/fume. Use in a well- ventilated area. Avoid generating dust. Dusts and fines from processing may be ignitable. Keep away from heat/sparks/open flames/hot surfaces. No smoking. 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.

STORAGE	DISPOSAL
Store away from strong acids, alkalis and oxidizers. Store in accordance with federal, provincial/state or local regulations.	Aluminum 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	% BY WEIGHT
Aluminum (Base metal)	**7429-90-5**	**90-99.7**
Alloying Elements:		
Zinc	7440-66-6	0-8.0
Copper	7440-50-8	0-6.0
Nickel	7440-02-0	0-2.0
Magnesium	7439-95-4	0-1.5
Manganese	7439-96-5	0-1.5
Silicon	7440-21-3	0-1.2
Iron	7439-89-6	0-1.0
Bismuth	7440-69-9	0-0.7
Lead	7439-92-1	0-0.7
Boron	7440-42-8	0.06 max
Cobalt	7440-48-4	0-0.6
Vanadium	7440-62-2	0.05 max
Titanium	7440-32-6	0-0.2

NOTES:
- For exact composition, refer to analysis or specifications.

4. FIRST AID MEASURES

DESCRIPTION OF NECESSARY FIRST AID MEASURES:

EYE CONTACT: DUST ACTS AS A FOREIGN BODY. 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:
Aluminum and aluminum alloys 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. Not applicable for solid product.
Use Class D extinguishing agents or sand on fires involving dusts or chips. Use extinguishers appropriate for surrounding materials.

Do NOT use water on molten metal. Do NOT use halogenated extinguishing agents on chips or fines.

SPECIFIC HAZARDS ARISING FROM MATERIAL: Dusts from grinding operation may burn if they are ignited. Dust, powder and fumes are flammable when exposed to flame or by chemical reaction with oxidizing agents. Aluminum chips, dust and fines in contact with water can generate flammable hydrogen gas.

HAZARDOUS COMBUSTION PRODUCTS: At temperatures above the melting point, fumes containing aluminum oxides and smaller amounts of other alloying elements may be liberated. If heated to very high temperatures, copper and zinc fumes may evolve.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS:
Firefighters should wear self-contained NIOSH-approved breathing apparatus and full protective clothing.

EXPLOSION DATA: Molten metal in contact with water may be explosive.

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 aluminum 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 aluminum in solid state.
Do not flush into surface water or sanitary sewer system.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP:
Solid metal does not pose any problems. Dust spills should be cleaned up avoiding dust generation. Wash down with water if in contact with acids. Avoid inhalation of dusts.
Collect scrap aluminum for recycling.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Not applicable to aluminum 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 generating dusts. Avoid breathing metal fumes and/or dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red. Eating, drinking or smoking should not be allowed in areas where this alloy is processed, handled or stored.

CONDITIONS FOR SAFE STORAGE: Other than incompatibles, no special storage conditions for aluminum in solid state.

INCOMPATIBLE PRODUCTS: Store away from strong acids, alkalis and oxidizers. Store away from halogenated compounds. Product should be kept dry to prevent corrosion.

8. EXPOSURE CONTROLS /PERSONAL PROTECTION

CONTROL PARAMETERS: The exposure limit for aluminum and aluminum alloy dusts has been established at 1 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/m3)		
Aluminum	**7429-90-5**	**1.0 (Respirable)**		
Zinc	7440-66-6	2.0 (As zinc oxide - respirable)		
Copper	7440-50-8	1.0 (Dust) 0.2 (Fume)		
Nickel	7440-02-0	1.5 (Metal) 0.2 (Insoluble) 0.1 (Soluble)		
Magnesium	7439-95-4	10.0 (as Magnesium oxide)		
Manganese	7439-96-5	0.2 (as inorganic Mn)		
Silicon	7440-21-3	10.0 (Inhalable) 3.0 (Respirable)		
Iron	7439-89-6	5.0 (Respirable)		
Bismuth	7440-69-9	Not Established		
Lead	7439-92-1	0.05 (Elemental)		
Boron	7440-42-8	Not Established		
Cobalt	7440-48-4	Not Established		
Vanadium	7440-62-2	0.05 (as Vanadium pentoxide)		
Titanium	7440-32-6	10.0 (as Titanium dioxide)		

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. Where local ventilation and vacuum systems are used to collect aluminum dusts and fines, use explosion-proof systems. Do not allow dusts to accumulate - good housekeeping practices must be maintained. Avoid all ignition sources.

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): With molten metal, use full body cover clothing suitably treated to prevent burns.

9. CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE:	Solid	**APPEARANCE:**	Silver gray solid

ODOUR:	Not Applicable	**ODOUR THRESHOLD:**	Not Applicable
pH:	Not Applicable	**MELTING POINT:**	521-650°C (970-1200°F)
BOILING POINT:	2494°C (4521°F) (approx.)	**FLASH POINT (°C):**	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:	2.7 (approx.)	**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. Aluminum and its alloys are stable under normal storage and handling conditions.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization cannot occur.
Chips, fines, dust and molten aluminum is considerably more reactive than the metal itself.

CONDITIONS TO AVOID: Water: slowly generates flammable hydrogen gas.
Acids & alkalis: reacts to generate flammable hydrogen gas and heat.
Oxidizers: violent reaction with considerable heat generation.
Note: generation rate is greatly increased with smaller particles (i.e. fines and dust)..
Avoid dust formation.
Molten metal can react violently with water or moisture.

INCOMPATIBLE MATERIALS: Yes, incompatible with strong acids, alkalis and oxidizers. Acetylene.

HAZARDOUS DECOMPOSITION PRODUCTS: None.
Products other than fire or explosion – does not decompose.
Toxic metal oxides, COx & NOx may be produced during a fire involving aluminum and its alloys.

11. TOXICOLOGICAL INFORMATION

TOXICITY:

COMPONENT	LD_{50} ORAL	LD_{50} DERMAL	LD_{50} INHALATION	OTHER
Aluminum	**Unknown**	**-**	**-**	**-**
Zinc	Unknown	-	-	-
Copper	Unknown	-	-	-
Nickel	>9,000 mg/kg Oral-Rat	-	-	-
Magnesium	230 mg/kg Oral-Rat	-	-	-
Manganese	9,000 mg/kg Oral-Rat	-	-	-
Silicon	3,160 mg/kg Oral-Rat	-	-	-
Iron	30,000 mg/kg Oral-Rat	-	-	-
Bismuth	10,000 mg/kg Oral-Rat	-	-	-
Lead	Unknown	-	-	-
Boron	2,000 mg/kg Oral-Mouse	-	-	-
Cobalt	6,171 mg/kg Oral-Rat	-	-	-
Vanadium	130 mg/kg Oral-Rat	-	-	-
Titanium	Unknown	-	-	-

LIKELY ROUTES OF ENTRY: None for Aluminum & alloys in their natural solid form.
Prolonged skin contact with coated aluminum 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.

EYES: High concentrations of dust may cause irritation to the eyes. Fumes can cause eye irritations. Ultra-violet radiation from welding can cause flash burns (welder's flash or pink eye).

SKIN: May cause skin irritations. Prolonged skin contact with coated aluminum may cause skin irritation in sensitive individuals. Workers with anemia, kidney damage, digestive, respiratory, nervous systems, pregnant women and fertile females warrant particular attention.

INHALATION: Dust may irritate nose and throat. If heated, aluminum fumes may cause metal fume fever, a delayed, benign, transient flu-like condition.

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL AND TOXICOLOGICAL CHARACTERISTICS:
None for Aluminum & alloys in their natural solid state.

EFFECTS OF ACUTE EXPOSURE TO MATERIAL: COPPER, ZINC & MANGANESE: Can cause metal fume fever, a metallic taste in the mouth, dryness or irritation of the throat, and coughing. After 4-48 hours symptoms can include sweating, shivering, headache, fever, muscle aches, nausea, vomiting, weakness, and tiredness.

EFFECTS OF CHRONIC EXPOSURE TO MATERIAL: 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.
LEAD: May damage kidneys, liver, blood system and reproductive system. IARC lists lead under its Group 2B category - "possibly carcinogenic to humans".

STOT (Single Exposure): Causes damage to organs (kidneys, respiratory system).

STOT (Repeated Exposures): Respiratory system. Allergic skin reactions. Reproductive system.

MUTAGENCITY OF MATERIAL: Suspected of causing genetic effects.

REPRODUCTIVE EFFECTS: Lead is suspected as causing damage to the reproductive system.

TERATOGENICITY OF MATERIAL: N/A

CARCINOGENICITY OF MATERIAL: 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".
LEAD: IARC lists lead under its Group 2B category - "possibly carcinogenic to humans".

SYNERGISTIC MATERIALS: N/A

ASPIRATION HAZARD: No data.

SENSITIZATION OF MATERIAL; Workers with skin sensitivity warrant particular attention.

LD_{50} (of Material): Not established **LC_{50} (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).

12. ECOLOGICAL INFORMATION

ECOTOXICITY: No data available for Aluminum & alloys in their natural solid state. 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.

COMPONENT	TOXICITY TO FISH	TOXICITY TO ALGAE	TOXICITY TO MICROORGANISMS
Aluminum	LC50 Rainbow Trout 96 hr. 0.16 mg/l	-	EC50 Water Flea 24 hr. 3.5 mg/l
Zinc	LC50 Fathead Minnow 96 hr. 2.16-3.05 mg/l	EC50 Freshwater Algae 72 hr. 0.09-0.125 mg/l	EC50 Water Flea 48 hr. 0.139-0.908 mg/l
Copper	LC50 Fathead Minnow 96 hr. 0.0068-0.0156 mg/l	EC50 Freshwater Algae 72 hr. 0.0426-0.0535 mg/l	EC50 Water Flea 48 hr. 0.03 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
Magnesium	-	-	-
Manganese	-	-	-
Silicon	-	-	-
Iron	LC50 Common Carp 96 hr. 0.56 mg/l	-	-
Bismuth	-	-	-
Lead	LC50 Common Carp 96 hr. 0.44 mg/l	-	EC50 Water Flea 48 hr. 0.0006 mg/l
Boron	-	-	-
Cobalt	-	-	-
Vanadium	-	-	-
Titanium	-	-	-

PERSISTENCE AND DEGRADABILITY: No data available.

BIOACCUMULATIVE POTENTIAL: No data available.

MOBILITY IN SOIL: No data available for aluminum & alloys in their 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: Aluminum scrap should be recycled whenever possible.

GENERAL INFORMATION: Dispose of in accordance with applicable federal, provincial/state or local regulations.

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
Aluminum	No	No	Yes	None listed
Bismuth	No	No	No	None listed
Boron	No	No	No	None listed
Cobalt	No	No	Yes	None listed
Copper	No	No	Yes	5,000 lb.
Iron	No	No	No	None listed
Lead	No	No	Yes	10 lb.
Magnesium	No	No	No	None listed
Manganese	No	No	Yes	None listed
Nickel	No	No	Yes	100 lb.
Silicon	No	No	No	None listed
Titanium	No	No	No	None listed
Vanadium	No	No	Yes	None listed
Zinc	No	No	No	1,000 lb.

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 lb. (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: Copper = 5000 lb. (2270 kg); Zinc = 1000 lb. (454 kg); Nickel = 100 lb. (45 kg).
CALIFORNIA (PROPOSITION 65): The Lead component of this material is known in the State of California to cause cancer, and/or birth defects (or other reproductive harm).
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: Lead is regulated under 29 CFR 1910.1025.

ADDITIONAL EUROPEAN UNION REGULATIONS:
RoHS & WEEE: This SDS 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 present in this aluminum alloy at levels above the EU Directive limit of 0.1%.
Note, the EU Directive has a lead exemption limit of up to 4.0% as an alloying element in aluminum.
Chromium VI (Cr +6): The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

16. OTHER INFORMATION

ALUMINUM & ALUMINUM ALLOYS

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
FLAMMIBILITY	0
REACTIVITY	0
OTHER	*

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

PREPARED BY: RUSSEL METALS INC. AND ENVIROTEST INC. **DATE:** AUGUST 2014

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