ALUMINUM ALLOYS MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE MATERIAL NAME: **ALUMINUM ALLOYS** SERIES 1000, 2000, 3000, 5000, 6000 & 7000 SYNONYMS: Includes Sheet, Plate & etc. WHMIS CLASS: D2A, D2B	Russel Metals	SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESOTA COURT, MISSISSAUGA, ONTARIO. CANADA. L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262 FORM#: MSDS-02-2011. DATE: NOVEMBER 2011.

1. PRODUCT INFORMATION

MATERIAL NAME: ALUMINUM ALLOYS

FORM #: MSDS-02-2011 **DATE:** NOVEMBER 2011

MATERIAL USE: MANUFACTURE OF ARTICLES

2. HAZARDOUS INGREDIENTS

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

COMPONENT	CAS NUMBER	TLV (ACGIH - mg/m³)	LD_{50}	% WEIGHT
ALUMINUM	**7429-90-5**	**1.0 (Metal & Insoluble Compounds - Respirable)**	**U**	**90-99.7**
CHROMIUM	7440-47-3	0.5 (Metal & Cr+3), 0.05 (Cr +6 Soluble), 0.01 (Cr +6 Insoluble)	U	<0.01-0.4
COPPER	7440-50-8	1.0 (Dust), 0.2 (Fume)	350 mg/kg Oral-Mouse	<0.05-6.0
IRON	7439-89-6	5.0 (as Iron Oxide - Respirable)	30,000 mg/kg Oral-Rat	<0.35-1.0
NICKEL	7440-02-0	1.5 (Metal), 0.2 (Insoluble), 0.1 (Soluble - all as Inhalable)	> 9,000 mg/kg Oral-Rat	<0.01-2.0
MAGNESIUM	7439-95-4	Not Established for Metal (10.0 for Magnesium Oxide)	U	<0.02-1.5
MANGANESE	7439-96-5	0.2 (as inorganic Manganese)	9,000 mg/kg Oral-Rat	<0.02-1.5
SILICON	7440-21-3	10.0 (Inhalable), 3.0 (Respirable-as non fibrous Silicon Carbide)	3,160 mg/kg Oral-Rat	<0.25-1.2
TITANIUM	7440-32-6	Not established (10.0 for Titanium Dioxide)	U	<0.02-0.2
COBALT	7440-48-4	0.02 (Dust & fume)	6,171 mg/kg Oral-Rat	<0.01-0.6
ZINC	7440-66-6	2.0 (as Zinc Oxide , Respirable)	U	<0.05-8.0
BISMUTH	7440-69-9	Not Established	10,000 mg/kg Oral-Mouse	<0.40-0.7
BORON	7440-42-8	10.0 (as Boron Oxide)	2,000 mg/kg Oral-Mouse	0.06 max
LEAD	7439-92-1	0.05 (Elemental & Inorganic Compounds as Lead)	U	<0.40-0.7
VANADIUM	7440-62-2	0.05 (Inhalable Dust or Fume as V_2O_5)	130 mg/kg Oral-Rat	0.05 max

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.

3. HAZARDS IDENTIFICATION

ROUTES OF ENTRY: None in its 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: 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. Ultra-violet radiation from welding can cause flash burns or skin burns.

TARGET ORGANS: Respiratory system.

ACUTE EFFECTS: MANGANESE, COPPER & ZINC: Inhalation overexposure to manganese, 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.

CHRONIC EFFECTS: 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.
COBALT: Cobalt dust may result in an asthma-like condition (cough, shortness of breath). 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: May cause a benign pneumoconiosis (siderosis).
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: 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: 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: No, not flammable.

MEANS OF EXTINCTION: Use extinguishers appropriate for surrounding materials. Use dry powder for aluminum metal fires.

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: Aluminum oxide and smaller amounts of other metallic oxides. If heated to very high temperatures, copper and zinc fumes may evolve.

UNUSUAL FIRE HAZARDS: Small aluminum chips, fine turnings and dust from processing or grinding may ignite readily. Aluminum dust or fines combined with air can form explosive mixtures. Aluminum chips, dust and fines in contact with water can generate flammable hydrogen gas.

SPECIAL FIRE FIGHTING: None for this product. Dry powder for aluminum metal fires. Do not use water on dust, powder, fume or molten metal fires.

6. ACCIDENTAL RELEASE MEASURES

LEAK AND SPILL PROCEDURES: Solid metal does not pose any problems. Dust or chip spills should be cleaned up avoiding dust generation. Collect and recycle to process. Wash down with water if in contact with acids. Avoid inhalation of dusts.

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. Avoid generating dusts. Avoid contact with sharp edges or with heated metal. Hot and cold aluminum are not visually different.

STORAGE: Store away from corrosive chemicals, such as acids. Product should be kept dry to prevent corrosion.

8. EXPOSURE CONTROLS

ENGINEERING CONTROLS:
(e.g. ventilation, enclosures, specify) General or local exhaust during welding or grinding 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.

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): 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
BOILING POINT:	2494°C (4521°F) (approx.)	**VAPOUR PRESSURE:**	Not Applicable	**VAPOUR DENSITY:**	Not Applicable
MELTING POINT:	521-650°C (970-1200°F)	**DENSITY:**	2.7 (approx.)	**pH:**	Not Applicable
EVAPORATION RATE:	Not Applicable	**SOLUBILITY:**	Not Applicable		

COEFFICIENT WATER/OIL DISTRIBUTION: Not Applicable

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Yes. Aluminum and its alloys are stable under normal storage and handling conditions.

HAZARDOUS POLYMERIZATION: Hazardous polymerization cannot occur.

INCOMPATIBILITY TO OTHER SUBSTANCES: Yes, incompatible with strong acids, alkalis and oxidizers. Acetylene.

CONDITIONS OF REACTIVITY: 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).

HAZARDOUS DECOMPOSITION PRODUCTS: None.
Products other than fire or explosion – does not decompose.

11. TOXICOLOGICAL INFORMATION

IRRITANCY OF MATERIAL: See Section 3.

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

LD_{50} (of Material): Unknown for aluminum.

LC_{50} (of Material): Not established

MUTAGENCITY OF MATERIAL: N/A

REPRODUCTIVE EFFECTS: LEAD: Clinical studies on test animals exposed to lead indicate adverse reproductive effects.

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".
LEAD: 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.

SYNERGISTIC MATERIALS: N/A

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: 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
Chromium	No	No	Yes	5,000 lbs
Cobalt	No	No	Yes	None listed
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
Vanadium	No	No	No	None listed
Zinc	No	No	No	1,000 lbs

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: Chromium = 5000 lb. (2270 kg); Copper = 5000 lb. (2270 kg); Nickel = 100 lbs (45 kg); Zinc = 1000 lb. (454 kg).

CALIFORNIA (PROPOSITION 65): The Chromium (VI) 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.
The Nickel 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: 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): 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 0.4% 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

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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