SAFETY DATA SHEET **SPECTRO ALLOYS, INC.**

ALUMINUM ALLOY 356

Section 1 – Identification

TRADE NAMES
Aluminum Foundry Ingot

CHEMICAL NAME
Mixture

FORMULA
Aluminum Alloys

MANUFACTURER'S NAME
SPECTRO ALLOYS, INC

EMERGENCY TELEPHONE NUMBER
(651) 437-2815

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Section 2 – Hazards Identification

Not hazardous in solid form at ambient temperature. Dusts, fines and/or particulates from processing may be readily ignitable. Fine particles and molten metal are highly reactive with water, oxidizers, acids, alkalis, halogenated compounds and certain metal oxides.

Section 3 – Composition/Information on Ingredients

Material	Element	Percent By Weight	CAS Number	EC Number
Aluminum	Al	Remainder	7429-90-5	231-072-3
Boron	B		7440-42-5	231-151-2
Chromium	Cr	0.10	7440-47-3	231-157-5
Copper	Cu		7440-50-8	231-142-3
Iron	Fe	0.12	7439-89-6	231-104-6
Lead*	Pb	0.050 max	7439-92-1	231-100-4
Magnesium	Mg	0.30 - 0.456	7439-95-4	231-159-6
Manganese	Mn	0.05	7439-96-5	231-130-8
Nickel	Ni		7440-02-0	231-111-4
Phosphorus	P		7723-14-0	231-768-7
Silicon	Si	6.5 - 7.5	7440-21-3	231-096-4
Strontium	Sr	0.030	7440-24-6	231-133-4
Tin	Sn		7440-31-5	231-141-8
Titanium	Ti	0.20	7440-32-6	231-158-0
Zinc	Zn	0.05	7440-66-6	231-105-1
Other (each)		0.05	N/A	N/A
Other (total)		0.05	N/A	N/A

*Present as impurity. While lead is not intentionally added to this mixture, it could potentially enter through the recycle stream.

Section 4 – First Aid Measures

EYE CONTACT If this material contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately.

SKIN CONTACT If this material contacts the skin, brush or vacuum off excess dust and promptly wash the contaminated skin with soap and water. Skin cuts and abrasion can be treated with standard first aid. If the material is molten, treat as a burn.

INHALATION OF DUST If a person breathes large amounts of this material move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention immediately.

INGESTION Ingestion of significant amounts of material is unlikely. If large quantities of this material are swallowed, induce vomiting in conscious individual. Get medical attention immediately.

NFPA RATINGS (HMIS) Health: 1 Fire: 0 Reactivity: 0

Section 5 – Fire Fighting Measures

In solid ingot form there is no fire or explosion hazard.

NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE.

EXTINGUISHING MEDIA	Aluminum alloys will not burn in the solid state. Like other metallic and organic dust and fine powder, aluminum alloy dust and powder may burn under some conditions. To extinguish, use Class D Agents (Lith X).
SPECIAL FIRE FIGHTING PROCEDURES	Confine metal powder dust fire, avoid spreading. Apply Class D (Lith X) powder in heavy quantities. DO NOT USE WATER OR MOIST SAND. Fire fighters should wear self-contained breathing apparatus and protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Fire or explosion may occur when material is in the form of dust and exposed to heat or flames, chemical reaction or contact with powerful oxidizers.

Section 6 – Accidental Release Measures

No special precautions are necessary for spills of bulk material. Wear gloves to prevent metal cuts.

If quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Do not use compressed air for cleaning. Cleanup personnel should wear approved respirators and protective clothing. Place all collected metal or particulates in a labeled container.

Molten metal spills can cause concrete to explode. Contain the flow using dry sand or salt flux as a dam. Do not use shovels or other hand tools to halt the flow of molten aluminum. Allow the spill to cool entirely before handling. Spilled molten metal can be reclaimed for reuse.

In the United States, this product must be disposed of in accordance with applicable federal, state and local solid waste labeling, shipping and disposal laws and regulations.

CERCLA Reportable Quantity (RQ): None Established.

Section 7 – Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Use good housekeeping practices to prevent accumulations of dust and keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes. Store metal in a dry area away from incompatible materials. Keep dust away from sources of ignition. Aluminum alloy sows and ingots may have shrink cavities that may contain moisture. Ice, snow, grease, oil or moisture can cause explosions if charged into a melting furnace. Remove these contaminants before charging ingot to melting furnace. Preheat metal when required to evaporate moisture prior to melting.
OTHER PRECAUTIONS	Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red. Handling molten aluminum presents special hazards. Refer to Aluminum Association Publication 69, "Guidelines for Handling Molten Aluminum". For extensive information, write the Aluminum Association, 818 Connecticut Ave., NW, Washington, DC 20006 for a copy of this publication.
SARA TITLE III THRESHOLD PLANNING QUANTITY (TPQ)	None established.

Section 8 – Exposure Controls/Personal Protection

RESPIRATORY PROTECTION Employees may wear NIOSH or MSHA approved respirators as specified by an Industrial Hygienist or qualified Safety Engineer for protection against airborne dusts or fumes.

VENTILATION Local exhaust ventilation is required when dust or fumes are generated. Use general and local exhaust ventilation to keep airborne concentrations of dust or fume below the OSHA PEL and TWA shown below.

PROTECTIVE GLOVES Advisable to avoid cuts and skin abrasions. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis

EYE PROTECTION Approved safety glasses or goggles should be worn when exposed to dusty or hot **material. Face shields should be worn around hot metal. Safety eyewash stations should** be provided near work areas.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT Full protective clothing should be worn by workers exposed to heavy concentrations of dust or high heat and during alloying operations to prevent injury from molten metal splashing, spilling, etc.

WORK/HYGIENIC PRACTICES Do not eat, drink or use tobacco products in work areas. Wash thoroughly after skin contact and before eating, drinking, use of tobacco products or using restrooms. Take a shower and change clothes at the end of the shift. All protective and contaminated clothing must be left at the plant. Launder all other work clothing separately from other household laundry.

Pre-employment medical evaluations should be provided. Attention should be directed to skin, eyes, respiratory tract, blood, kidneys, pulmonary function and neurological health. Chest x-rays should be included if symptoms are present.

EXPOSURE LIMITS

Material	Element	CAS Number	Human Carcinogen[a]	Form	OSHA[a] 8-Hr PEL mg/m^3	ACGIH 8-Hr TLV mg/m^3
Aluminum	Al	7429-90-5	No	Dust Dust	15 TD[b] 5 RF[c]	1 ND[d]
Boron	B	7440-42-5	No	All	ND	ND
Chromium	Cr	7440-47-3	Yes[a]	All	1	0.5
Copper	Cu	7440-50-8	No	Dust Fume	1 0.1	1 0.2
Iron	Fe	7439-89-6	No	All	ND	ND
Lead	Pb	7439-92-1	Yes[a]	All	0.05	0.05
Magnesium	Mg	7439-95-4	No	All	ND	ND
Manganese	Mn	7439-96-5	No	Dust Fume	 5 C[e]	0.2 0.2
Nickel	Ni	7440-02-0	Yes[a]	All	1	0.05
Phosphorus	P	7723-14-0	No	All	ND	ND
Silicon	Si	7440-21-3	No	All	15 TD 5 RF	10 ND
Strontium	Sr	7440-24-6	No	All	ND	ND
Tin	Sn	7440-31-5	No	All	2	2
Titanium	Ti	7440-32-6	No	All	ND	ND
Zinc	Zn	7440-66-6	No	Dust Fume	ND 15	ND 5
Other		N/A		All	ND	ND

Notes [a]Identified as a potential human carcinogen
[b]TD: Total Dust
[c]RF: Respirable Fraction of Dust
[d]ND: For dusts without an explicit OSHA PEL, a nuisance dust PEL applies (15 mg/m^3 total dust, 5 mg/m^3 respirable fraction of dust.)
[e]C: Ceiling Limit

Section 9 – Physical and Chemical Properties

Appearance	Silvery gray odorless solid	**Vapor pressure**	~0 mm Hg
		Odor threshold	N/A
Specific Gravity (H_2O = 1)	2.6 – 2.9	**Vapor density (Air = 1)**	N/A
Melting point	1,050 – 1,220 °F (566 – 660 °C)	**Evaporation rate (Butyl Acetate = 1)**	N/A
Boiling point	3,733 °F (2,056 °C)	**Solubility in water (at 20°C)**	Insoluble
		pH	N/A
Flammability	Nonflammable	**Flash point**	N/A
Upper/lower explosive limits	Not applicable	**NFPA fire code**	0

Section 10 – Stability and Reactivity

STABILITY	Stable at room temperature.
INCOMPATIBILITY (MATERIALS TO AVOID)	NEVER PUT WATER ON MOLTEN METAL - IT WILL EXPLODE. Reaction with mineral acids, water-soluble cutting oils, dilute hydrochloric acid, sulfuric acid, potassium hydroxide or sodium hydroxide may liberate hydrogen. Avoid contact with acids, bases and oxidizing agents. For additional information consult Safety Data Sheets for component materials.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS	Evolved hydrogen in confined areas may be an explosive hazard (see directly above). Potentially hazardous oxides of metals may be produced when aluminum alloys are heated, welded or in molten state
HAZARDOUS POLYMERIZATION	Will not occur.

Section 11 – Toxicological Information

ROUTES OF ENTRY	Inhalation? Yes Skin? Yes Ingestion? No
HEALTH HAZARDS (ACUTE AND CHRONIC)	Aluminum and aluminum alloys are not generally regarded as industrial toxins. In normal use, few health hazards occur. No health hazard or toxicity information exists specifically for this material. Data for major components are given instead. For each component in this material, the percent by weight can be used as a rough guide to the component's likely significance.
Inhalation	Cutting, melting or welding may produce dusts or fumes containing the component elements and their oxides. Breathing these dust or fumes may present potentially significant health hazards. These may include mucous membrane irritation and lung changes in workers, potentially leading to pulmonary diseases. Inhalation of finely divided aluminum powder may cause pulmonary fibrosis (aluminosis). Symptoms include anorexia, shortness of breath, dry cough, chest pain on respiration and epigastric abdominal pain. Fumes of copper, magnesium, manganese and zinc oxide may cause metal fume fever with flu-like symptoms. Overexposure to manganese fumes may cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure may affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis. Overexposure to tin dusts may cause irritation of the skin and mucous membranes, and may result in a benign pneumoconiosis (stannosis). Chromium and nickel compounds have been associated with allergic reactions, rashes and lung changes. Nickel is a respiratory irritant and may cause pneumonitis.
Skin	Dusts or fumes containing component elements of aluminum alloys may cause skin or mouth irritation. Copper may cause skin and hair discoloration. Magnesium particles imbedded in the skin may cause severe lesions, with slow healing.
Eyes	Dusts or fumes containing component elements of aluminum alloys may cause eye irritation.
Ingestion	Ingestion of significant amounts of material is unlikely.
UNUSUAL CHRONIC TOXICITY	Chromium, lead and nickel have been identified as potential human carcinogens.
CARCINOGENITY (Aluminum)	NTP? No IARC Monographs? No OSHA Regulated? No
SIGNS AND SYMPTOMS OF EXPOSURE	Irritation of skin and mucous membranes; cough; difficulty in breathing. Exposure to dust or fume may cause irritation of skin and mucous membranes, cough, difficulty in breathing and lung changes in workers, potentially leading to pulmonary diseases.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE	None reported.

Section 12 – Ecological Information

ECOTOXICITY Has not been demonstrated using standard OECD protocol.

MOBILITY Aluminum is not mobile in the environment unless contact is made with an aqueous environment with a pH below 5.5 or above 8.5.

BIODEGRADABILITY Not relevant for metals.

Section 13 – Disposal Considerations

WASTE DISPOSAL METHOD Sell waste material for scrap.

RCRA CLASSIFICATION None established

RCRA HAZARDOUS WASTE NUMBER None established

Section 14 – Transport Information

No specific regulations apply to this material when transported in mass solid form at ambient temperature.

Section 15 – Regulatory Information

USA This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR 372:

Chemical Name	CAS Number	Percent By Weight
Aluminum (fume or dust only)	7429-90-5	[a] [b]
Chromium	7440-47-3	[a]
Copper	7440-50-8	[a]
Lead	7439-92-1	[a]
Manganese	7439-96-5	[a]
Nickel	7440-02-0	[a]
Zinc (fume or dust only)	7440-66-6	[a] [b]

[a] See Section 3, Composition/Information on Ingredients, for percentage by weight.
[b] Must be adjusted by the fraction of the material that exists as fume or dust.

THIS INFORMATION MUST BE INCLUDED IN ALL SDS' THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

Canada WHMIS Classification: D2B Toxic material causing other toxic effects

EU Warning Symbol(s): None
Risk Phrase(s): None
Safety Phrase(s): None

Section 16 – Other Information

THIS SAFETY DATA SHEET SHOULD BE MADE AVAILABLE BY THE BUYER TO EACH OF THE BUYER'S PLANT WORKERS. CHANGES MADE TO THIS DOCUMENT TOTALLY VOID THE VALIDITY OF THIS SDS.

NOTICE

The buyer assumes all risk in connection with the use of the material. The information contained in this sheet is developed from what are believed to be accurate and reliable sources. **SPECTRO ALLOYS, INC.** and Charles Licht Engineering Associates make no warranties, expressed or implied and assume no responsibility for the accuracy or completeness of the data contained in this Safety Data Sheet.

REFERENCES

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