PRODUCT NAME: Aluminum alloy

Section 1 – Chemical Product and Company Identification

Vista Progressive Metals
800 Martin Luther King Drive
Adairsville, Georgia 30103 USA

For additional information contact: tim@vistametalsgeorgia.com

Emergency Telephone:

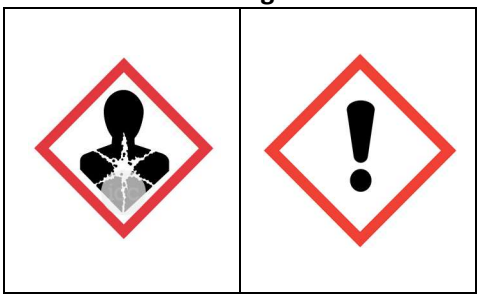
- **Emergencies:**
  - 1.770.773.7653 (US, Canada, and North American Numbering Plan-NANP).
  - *Country of call origin exit code* + 1.770.773.7653 (Outside of US, Canada, and NANP).

Synonyms: aluminum-lithium alloys, aluminum-lithium billet, aluminum-lithium ingot, aluminum-lithium slab

Typical uses: fabricated into extrusions, forgings, and plate.

Section 2 – Hazard Identification

UN GHS Hazard Pictograms



Possible primary routes of entry: inhalation and eye contact.
Signs and symptoms of exposure: mucous membrane, skin and eye irritation.
Carcinogenicity: this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm (California Proposition 65).
Physical hazards: stable under normal conditions.
Health hazards: irritant; digestive, eye, respiratory, and skin hazard.
Medical conditions generally aggravated by exposure: none unless excessive, repeat exposure. See **Section 4 – First Aid Measures** and **Section 8 – Exposure Controls and Personal Protection**.
The following health and physical hazard classes apply:

- Acute toxicity, category 0.
- Flammable solid, category 0.

- Eye irritation, category 1.
- Respiratory irritation, category 1.
- Skin irritant, category 1.

GHS Signal Word: DANGER

Note: Risk phrases are applicable only during machining, cutting, drilling, grinding or other related processing operations that result in the disturbance or alteration of the metal or coatings; solid, unmodified dross presents minimal health risks

GHS Hazard Phrases
H228: Flammable solid
H260: In contact with water releases flammable gases, which may ignite spontaneously
H261: In contact with water releases flammable gas
H301: Toxic if swallowed
H311: Toxic in contact with skin
H315: Causes skin irritation
H318: Causes serious eye irritation
H331: Toxic if inhaled

GHS Precaution Phrases
P210: Keep away from heat/sparks/open flames/hot surfaces. –No smoking
P223: Do not allow contact with water
P231 + P232: Handle under inert gas. Protect from moisture
P240: Ground/bond container and receiving equipment
P241: Use explosion-proof electrical/ventilating/lighting equipment
P261: Avoid breathing dust/fume/gas/mist/vapours/spray
P262: Do not get in eye, on skin or clothing
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product
P273: Avoid release to the environment
P280: Wear protective gloves/ eye protection/ face protection.
P281: Use personal protective equipment as required
P285: In case of inadequate ventilation wear respiratory protection

GHS Response Phrases
P302 + P335 + P334: IF ON SKIN: Brush off loose particles from skin and immerse in cool water.
P303+P361+P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338: IF IN EYES: Rinse cautiously with water or several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists, get medical advice/attention.
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312: Call a POISON CENTER/doctor if you feel unwell.
P370 + P378: IN CASE OF FIRE: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

GHS Storage and Disposal Phrases
P402 + P404: Store in a dry place. Store in a closed container.
P403: Store in well ventilated place.
P501: Dispose of contents/container according to local, state and federal regulations.

Section 3 – Composition and Hazard Information about Ingredients

Ingredient	CAS#	Approximate weight % content	8-hour TWA Exposure Limit OSHA (type)	LC50	Lethal Dose (LD)*
Aluminum	7429-90-5	>90	15 mg/m^3 (PEL) 10 mg/m^3 (Cal/OSHA PEL)	NA	NA
Zinc	7440-66-6	<5.0	5 mg/m^3 (fume PEL)*** 2 mg/m^3 (fume ACGIH TLV)***	NA	NA
Copper	7440-50-8	<5.5	0.1 mg/m^3 (fume PEL) 1 mg/m^3 (dusts and mists PEL) 0.2 mg/m^3 (fume ACGIH, TLV) 1 mg/m^3 (dusts and mists ACGIH TLV)	NA	LDLO: 100 mg/kg: ETA** (rat intrapleural) LDLO: 120ug/kg: GIT** (human oral)
Magnesium	7439-95-4	<5.0	15 mg/m^3 (PEL)*** 10 mg/m^3 (Cal/OSHA PEL)***	NA	LDLO: 230 mg/kg (dog oral)
Lithium*	7439-93-2	<2.5	Not established	NA	NA
Manganese	7439-96-5	<0.8	5 mg/m^3 (ceiling PEL) 0.2 mg/m^3 (Cal/OSHA PEL) 0.02 mg/m^3 (resp. ACGIH TLV)	NA	LD50: 9,000 mg/kg (rat, oral) LDLO: 400 mg/kg, 1Y-I:ETA** (rat, intramuscular)

Note: See **Section 5- Fire Fighting Procedures** for additional flammability information.
*LDLO, is the lowest dosage per unit of bodyweight of a substance known to have resulted in death in a group of test animals; LD50, the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
**ETA; equivocal tumorigenic agent. GIT; gastrointestinal tract.
***There are no established occupational exposure limits for zinc and magnesium. The table includes occupational exposure limits for zinc oxide and magnesium oxide, which may be formed during burning, welding or other fuming processes.

Section 4 – First Aid Measures

- Eye contact: if the material contacts the eyes:
  - Wipe away any excess material around the eyes.
  - Immediately flush the affected eye(s) with cold, gently flowing water for a minimum of 15 minutes while holding the eyelid(s) open. Obtain medical attention if irritation persists, or if particles are lodged in surface of the eye(s). Take special care if the exposed person is wearing contact lenses.
- Skin contact: gently brush away excess material. During machining operations sharp edges may be created which presents an abrasion hazard. If abrasions do occur seek medical help to stop bleeding.
- Inhalation: if dust is inhaled:
  - Move immediately to an area with fresh air.
  - Pre-existing diseases of the upper respiratory tract and lungs such as bronchitis, emphysema, and asthma may be aggravated by exposure to dust.
- Ingestion:
  - DO NOT induce vomiting.

- Rinse mouth with water.
- Unlikely under normal conditions of use, but swallowing may result in abdominal discomfort.

Section 5 – Fire Fighting Procedures

- Auto-ignition temperature: not applicable to solid dross.
- Flammability: solid dross is non-flammable.
  - Lithium will react violently in the presence of water and start a fire when present as pure lithium, but unlikely to be present even during machining operations.
  - Magnesium is highly flammable when in fine powder form, but unlikely to be present even during machining operations.
- Flash point: 400^{o}C/752^{O}F (aluminum).
- Products of combustion: metal (lithium) oxides, alloy elements, and oxides of carbon and nitrogen.
- Extinguishing media: not a fire hazard unless in powdered or finely divided state. Suspension of aluminum dust in air may pose a severe explosion hazard. In case of aluminum fire, use a class D dry-powder extinguisher. Do not use water or halogenated extinguishing media.
- Fire-fighting procedures: do not release runoff from fire control methods to sewers or waterways. Wear a self-contained breathing apparatus (SCBA) with a full face piece operated in pressure-demand or positive pressure mode and full protective clothing. Only fight fire if properly trained.

Section 6 – Accidental Release Measures

- Environmental precautions: keep away from sewers and surface water.
- If molten: contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of molten metal. Allow the spill to cool before re-melting as scrap.
- Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. For personal protective equipment, see **Section 8**.
- Methods for containment and cleaning up: Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Do not flush with water. Keep in suitable, closed containers for disposal.

Section 7 – Handling and Storage

- Storage: store away from acids and other incompatible materials.
- Processing: avoid breathing metal fumes or dust generated during machining operations. Practice good housekeeping. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition – No smoking.

- Provide grounding and bonding where necessary to prevent accumulation of static charges during aluminum dust handling and transfer operations.
- Re-melting: molten aluminum and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on contained in aluminum scrap or re-melt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. Drops of molten aluminum in water (i.e. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen to present an explosion hazard. Circulation of the water and removal of the metal particles minimize the hazards.
- During melting operations, the following minimum guidelines should be observed:
    - Inspect all aluminum materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
    - Store materials in dry, heated areas with any cracks or cavities pointed downwards.
    - Preheat and dry large items such as ingot adequately before charging into a furnace containing molten aluminum. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal of temperature of the coldest item if the batch it 400^{o}F and then hold at that temperature for 6 hours.
    - Dross that is charged into molten aluminum should always be preheated.

Section 8 – Exposure Controls and Personal Protection

- Exposure limits: when aluminum-lithium alloys are heated above 260 ^{o}C/500 ^{o}F, surface oxidation occurs forming metal (lithium) oxide and hydroxide. The American Industrial Hygiene Association has recommended a Workplace Environmental Exposure Level (WEEL) of 1 mg/m^3 for lithium oxide and hydroxide particulate.
- Machining operations such as burning, welding, sawing, brazing, machining, and grinding may cause health effects if exposures exceed recommended limits as listed under **Section 3 – Composition and Hazard Information about Ingredients**.
- Respiratory protection: use a NIOSH/OSHA approved dust mask if dust is generated during machining operations or otherwise present in concentrations above the Permissible Exposure Limit (PEL) for nuisance particulates. Excessive inhalation to fumes of metal oxide particles can produce an acute reaction known as “metal fume fever”. Symptoms consist of chills and fever, metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. Oxide fumes of manganese and copper have been associated with causing metal fume fever. Chronic inhalation of excessive concentrations of metal fumes may result in pneumoconiosis, pulmonary disorders, respiratory irritation, asthma, nosebleed, and ulceration of the nasal septum, as well as respiratory cancer.
- Protective gloves: work gloves are recommended during machining operations. Skin exposure to solid product in itself is not expected to present any significant hazards; however, prolonged skin contact may irritate skin.
- Eye protection: excessive exposure to high concentrations of dust may cause irritation to the eyes. Particles of iron compounds may become imbedded in the eye and cause rust stains unless removed promptly. Use safety glasses or goggles as required for machining operations.

- Environmental exposure controls: Contain spills using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of molten metal. Allow the spill to cool before re-melting as scrap.

Section 9 – Physical and Chemical Properties

- Solid, odorless metal with a bright metallic gray color.

MATERIAL:	Aluminum	Lithium
BOILING POINT:	2,640°C (4,784°F)	1,342°C (2,448°F)
SPECIFIC GRAVITY (H2O = 1):	not applicable	not applicable
MELTING POINT:	482-649°C (900-1,200°F)	180°C (356°F)
FREEZING POINT:	482-649°C (900-1,200°F)	180°C (356°F)
VAPOR PRESSURE (mm Hg):	not applicable	not applicable
VAPOR DENSITY (AIR = 1):	not applicable	not applicable
SOLUBILITY IN H2O, % BY	insoluble	insoluble
% VOLATILES BY VOLUME:	not applicable	not applicable
APPEARANCE AND ODOR:	gray, odorless	gray, odorless
DENSITY @ 20°C:	2.99-3.12 kg/l	0.534 g/ml (25°C)

Section 10 - Stability and Reactivity

- Stability: stable.
- Conditions to avoid: molten aluminum can react violently with water, rust, and certain metal (lithium) oxides.
- Incompatibility: may be incompatible with strong acid and alkaline solutions. May form hydrogen when mixed with strong acids.
    - Lithium will react violently in the presence of water and start a fire when present as pure lithium. But unlikely to be present as pure lithium even during machining operations.
- Reactivity: molten aluminum may explode on contact with water. In the form of particles, may explode when mixed with halogenated acids, halogenated solvents, bromates, iodates or ammonium nitrate. Aluminum particles on contact with copper, lead, or iron oxides can react vigorously with the release of heat.
- Hazardous reaction/decomposition products: hydrogen gas may be generated when mixed with acids, bases, and solvents. Burning of the metal produces metal oxides, alloy elements, and oxides of carbon and nitrogen.

Section 11 – Toxicological Information

Toxicology limits: **Section 3 – Composition and Hazard Information about Ingredients.**

Acute exposure: mild eye, skin, ingestion, and inhalation irritation.

- Eyes: symptoms include redness and epiphora.
- Skin: symptoms include redness and irritation.
- Ingestion: symptoms may include, but are not limited to, thirst, abdominal pain, gastroenteritis, and inflammation of the digestive tract.
- Inhalation: symptoms include, but are not limited to, coughing, sneezing, wheezing and shortness of breath.

Chronic exposure: potential irritant for skin sensitization, inhalation toxicity and ingestion toxicity. Persons with pre-existing conditions will have increased sensitivity.

- Skin: repeated or prolonged skin contact may cause irritation, dryness or cracking of the skin.
- Inhalation and inhalation: chronic toxicity occurs within 4 to 10 days following ingestion of large quantities. Repeated or prolonged inhalation or ingestion may cause metabolic abnormalities and sodium retention. Metabolic abnormalities include acidosis, hypernatremia, hypochloremia, alkalosis, hypocalcaemia, or sodium retention may affect the blood, kidneys, respiration, and cardiovascular system. Severe toxicity may affect the behavior/central nervous system. Neurological changes may result metabolic abnormalities that may include, but are not limited to, fatigue, irritability, dizziness, mental confusion, paresthesia, seizures, tetany, and cerebral edema.

Carcinogenicity: **California Proposition 65.**

WARNING: <u>This product contains the following chemicals known by the State of California to cause cancer, birth defects, or other reproductive harm:</u>

CHEMICAL	CAS NUMBER	END POINT		
		CANCER	BIRTH DEFECTS	REPRODUCTIVE TOXICITY
Beryllium	7440-41-7	X		
Cadmium	7440-43-9	X	X	X
Lead	7439-92-1	X	X	X
Nickel	7440-02-0	X	X	X

For more information, go to www.P65Warnings.ca.gov.

International Agency for Research on Cancer (IARC): not reviewed by IARC.
American Conference of Industrial Hygienists (ACGIH): not available.
Reproductive toxicity: not established.
Teratogenicity: not established.
Embryotoxicity: not established.
Mutagenicity: not established.

Section 12 – Ecological Information

- Ecotoxicity: no information found.
- Mobility: not available.
- Persistence and degradability: no information found.
- Bioaccumulative potential: not available.
- PBT assessment: not available.
- Other adverse effects: not available.

Section 13 – Disposal Considerations

- Waste must be disposed of in accordance with federal, state, and local regulations.

Section 14 – Transport Information

- UN number: not applicable.
- Not a United States Department of Transportation (USDOT) regulated hazardous material (49 CFR 172).
- International Maritime Dangerous Goods (IMDG): not regulated as dangerous good.
- International Air Transport Association (IATA): not regulated as dangerous good.
- European Agreements Concerning the International Carriage of Dangerous Goods by Rail (RID) and by Road (ADR): not regulated as dangerous good.
- Canadian TDG: not regulated as dangerous good.
- Not regulated under the United Nations Economic Commission for Europe (UNECE) European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN 2013).
- Not regulated under the Australian Dangerous Goods Code (ADG7).

Section 15 – Regulatory Information

- US HAP Listed Substances (when in dust form):

CHEMICAL:	CAS NUMBER:
Cadmium compounds	- -
Chromium compounds	- -
Lead compounds	- -

- SARA Section 313 Notification: This material contains the following SARA 313-listed chemicals:

CHEMICAL:	CAS NUMBER:
Aluminum (fume/dust)	7429-90-5
Beryllium	7440-41-7
Cadmium	7440-43-9
Chromium	7440-47-3
Copper	7440-50-8
Lead	7439-92-1
Manganese	7439-96-5
Zinc (fume or dust)	7440-66-6

- Please contact VMC Specialty Alloys, LLC for additional information prior to completing any EPCRA report.
- California Proposition 65: this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.
- The European Community: all components of this product are listed on MITI, the Ministry of International Trade Industry.
- Canadian Domestic Substances List: all components of this product listed on the Canadian DSL.
- 49 CFR 171 Reportable Quantity: none listed.
- 40 CFR 355 Reportable Quantity: none listed.
- VOC content, material: 0.
- VOC content, less water: 0.
- Clean Air Act Ozone Depleter: none listed.

Section 16 – Other Information/Disclaimer

- Revised May 2021.
- US NFPA Standard 704 Rating. Health=1 (dust); Fire=0; Reactivity=0.