

Material Safety Data Sheet

Material Name: Aluminum & Aluminum Re-melt Ingot/Billet Alloys

Original: August 15, 1997

Revised: September 29, 2005

TST Inc. 11601 Etiwanda Avenue, Fontana, California 92337 USA

Emergency Phone: (951)-685-2155

SECTION I. Material Description

Chemical Name & Formula: Aluminum Pure &/or Alloyed Aluminum using common Constituent blends and traces of silicon, iron, copper, magnesium, manganese, chromium, nickel, zinc, lead, titanium, and tin.

Other Designations: Aluminizing, Foundry, Rich Alloy, RSI, unalloyed ingot, Scrap Aluminum deox, billet, and or slab.

Manufacturer: Timco Division, Standard Metals Division and Tandem Division of TST, Inc.

Product Use: Alloying or cast aluminum ingot, billet, or casting, forging, rolling, drawings, and machining.

SECTION II. Composition / Ingredients

CAS #	Component	Percent Content	ACGIH		OSHA
			TLV	STEL	PEL
7429-90-5	Aluminum	> 80	10	5	15
7440-21-3	Silicon	< 15	10	-	10
7440-50-8	Copper	< 7	0.2*	-	0.1**
7440-66-6	Zinc	< 9	5	10	5
7439-95-4	Magnesium	< 6	10	-	15
7440-02-0	Nickel	< 1.5	1.5	-	1
7439-89-6	Iron	< 2	-	-	-
7439-96-5	Manganese	< .6	0.2	-	5
7440-31-5	Tin	< .2	2	-	2
7440-47-3	Chromium	< .45	0.5	-	1
7440-41-7	Beryllium	< .5	0.002	0.005	0.025
7440-32-6	Titanium	< .3	10	-	15
7439-92-1	Lead	< .2	0.05	-	30

Component Information:

Percentages of each constituent will vary with the alloy blend. Unless the alloy blend is known, processor should assume that all potential ingredients are present. **Exposure Limits are in TWA in mg/m³**

*Fume concentrations TWA; dusts and mists, as Cu: 1mg/m³

**Fume, as Cu: 0.1 mg/m³ TWA; dusts and mists, as Cu: 1mg/m³ TWA.

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SECTION III. Hazards Identification

Emergency Overview:

Description:

Solid, Silvery, Odorless metallic shapes, As shipped, the product is Non-Flammable and considered non-hazardous. Dust, small chips, fine turnings and particulate matter may cause irritation of eyes, skin, mucous membranes, and respiratory tract. Product is not considered an environmental hazard.

Explosion/fire hazards may be present when:

Dust or fines are dispersed in the air.

Chips, or dust or fines are in contact with water.

Dust or fines are in contact with certain metal oxides.

Molten aluminum metal comes in contact with water/moisture or certain metal oxides.

Dust and fume from processing can cause irritation of eyes, skin and upper respiratory tract, metal fume fever, lung disease and other health effects listed below.

Potential Health Effects

(Present only if dusts or fumes are generated by processing, milling, cutting ...ect.)

Eyes: Can cause irritation

Skin: Vapors, dusts fumes, and particulate matter may cause irritation

Inhalation: Can cause irritation of upper respiratory tract, metal fume fever and other health effects listed below. Inhalation of high concentrations of metal oxide fumes from processing aluminum alloys may cause Metal Fume Fever. Symptoms include fever, chills, sore muscles and joints, and a metallic taste in the mouth. The condition is self limiting and should resolve itself in 24-48 hours.

Ingestion: Not expected to be an important route of entry into the body.

Chronic and Carcinogenicity:

Prolonged exposure to dusts and particulate matter may cause dermatitis and sensitization.

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SECTION IV. First Aid Measures

- Eyes:** Flush with tepid water for at least 20 minutes holding the eyelids wide open. Seek medical attention if irritation develops.
- Skin:** Wash thoroughly with mild soap and water. Seek medical attention if irritation develops. Remove any contaminated clothing and launder thoroughly before reuse.
- Inhalation:** Remove exposed person to fresh air. If breathing is difficult, oxygen may be administered. If breathing has stopped, artificial respiration should be started immediately. Seek medical Attention.
- Ingestion:** Not expected to be an important route of entry into the body. If large amounts of product are ingested, seek medical attention and advise physician.

SECTION V. Fire Fighting Measures

Flammable Properties:

Product does not present fire or explosion hazards as shipped. Small chips, turnings, dust or fines from processing may ignite readily.

Fire/Explosion:

Possible potential under any of the following conditions.

- * Dust or fines dispersed in the air can be explosive Even minor dust clouds are potentially dangerous.
- * Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas in a confined space or poorly ventilated space could present an explosion hazard
- * Fines and dust in contact with certain metal oxides (ie.. Rust). Thermite reactions can be initiated easily by weak ignition sources.
- * Molten metal in contact with water/moisture or other metal oxides. Moisture en-Trapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction.

Extinguishing Media:

Use coarse water spray on chips and turnings. Use Class D extinguishing agents on dusts, fines or molten metal. DO NOT USE: Halogenated agents on small chips, dusts or fines.

Fire Fighting Equipment/Instructions:

Fire Fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

Flash Point: NA **LEL:** NA **UEL:** NA **Auto Ign. Temp:** NA

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SECTION VI. Accidental Release Measures

Dust or fines, Pick up released product with appropriate implements and return to original container if reusable. If not reusable, place in appropriate containers for disposal. Appropriate personal protective equipment cited in Section VIII should be worn during all clean-up operations.

If molten, contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to handle the flow of molten metal. Allow the spill to cool and harden, then follow above.

SECTION VII. Handling and Storage

Product should be kept dry. Avoid generating dust. Do not store with or near incompatible materials cited in Section X. Appropriate personal protective equipment cited in Section VIII should be worn during handling. Wet mopping or vacuuming is recommended to clean up dusts that may be generated during handling and processing. Avoid all ignition sources. Use non-sparking handling equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during aluminum dust handling and transfer operations. Good housekeeping practices must be maintained.

Remelting of Aluminum material

Molten aluminum becomes explosive when combined with water. Water and other forms of contamination on or contained in aluminum are known to have caused explosions in melting operation. Even small amounts of water can lead to violent explosions.

All tooling and containers which come in contact with molten aluminum must be preheated or specially coated and rust free. Molds and ladles must be preheated or coated with protection prior to casting. Any surfaces that may contact molten aluminum (like concrete) should be specially coated.

Drops of molten aluminum in water (ie. during plasma arc cutting) while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Constant circulation of the water and removal of the aluminum particles minimize the hazards.

Minimum recommendations for re-melting product.

- * Inspect product prior to pre-heating. Remove all forms of water, ice, grease, oil, and any forms of oxide contamination.
- * Store product in dry, heated areas.
- * Preheat large items adequately before charging in furnace with molten metal. Failure to follow these guidelines may result in metal explosion, property damage, and extreme danger to employees working in the area. Interior temperatures of product must not be below 500⁰ F before inserting into molten pool.

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SECTION VIII. Personal Protection & Exposure Controls

Engineering Controls: For fume exposure, use with local exhaust ventilation to meet the exposure limits as listed in Section II. If engineering controls fail to mitigate exposure to limits listed, use NIOSH approved respiratory protection.

Respiratory Protection: Minimum requirements include NIOSH approved ½ face-piece respirator with cartridges approved for organic vapors and particulate matter with an exposure limit of not less than 0.05 mg/m³. If exposures exceed 10 times the limits cited in Section 2, consult your respiratory protection equipment supplier or a professional industrial hygienist for selection of the proper equipment.

Eye Protection: Chemical protective goggles are recommended where there is the possibility of eye contact with the product. Safety glasses with side-shields are recommended for all other operations.

Skin Protection: Appropriate gloves to avoid direct skin contact.
Personnel who handle and work with molten aluminum should utilize primary protective clothing: face shields, fire resistant clothing, jackets, leggings, spats, and similar equipment to prevent burn injuries. In addition to primary protection, secondary work clothing that is fire resistant and sheds metal splash is recommended for use with molten aluminum.

SECTION IX. Physical & Chemical Properties

Appearance:	Solid, gray, metallic shapes
Boiling Point:	Not applicable
Freeze-Melt Point:	900°-1200°F (482° – 660° C)
Vapor Pressure (mm):	Not applicable
Vapor Density (air = 1):	Not applicable
Solubility in Water:	Insoluble to slight solubility
Specific Gravity/Bulk Density:	2.5-2.9 g/cc
Evaporation Rate (Butyl Acetate=1):	Not applicable
pH:	Not applicable
Odor:	None
Coefficient of water/oil Distribution:	Not applicable
% Volatile by Volume:	Not Volatile as shipped

SECTION X. Stability & Reactivity

Stability:
Stable under normal conditions of use, storage, and transportation as shipped.

Conditions to Avoid:
Chips, fines, dust and molten metal can be reactive with the following:

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Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles like fines or dust. Molten metal can react violently/explosively with water or moisture, especially when the water is entrapped.

Heat: Oxidizes at a rate dependent upon temperature and particle size.

Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.

Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines, and dusts).

Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided aluminum.

Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. Molten aluminum can react violently with iron oxide without external ignition source.

Iron powder and water: An explosive reaction forming hydrogen gas occurs when heated above 1470 ° F (800 ° C).

SECTION XI. Toxicological Information

Aluminum metal and alloys have a low order of both acute and chronic toxicity.

Sensitization to chromium and other metals will generally take the form of a skin rash at the site of contact. Once an individual becomes sensitized, they should not have any further contact with the causative agent since any exposure will trigger the symptoms.

PNAHs are known to cause skin cancer on prolonged, intimate dermal contact. There is also evidence that these can cause lung cancer if high concentrations are inhaled over prolonged periods of time. If good personal and industrial hygiene practices are followed, the development of cancer is not likely.

SECTION XII. Ecological Information

No information found on ecotoxicological or chemical fate study findings.

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SECTION XIII. Disposal Considerations

As supplied, product is considered non-hazardous. Recycling is preferred method of disposal. Alternatively dispose in an EPA approved landfill in accordance with local, state, and federal rules and regulations. TCLP testing should be conducted to determine hazard characteristics if disposed of as waste products.

SECTION XIV. Transportation Information

Not currently regulated under Department of Transportation regulations as shipped.

Aluminum Powder is regulated: Aluminum Powder, UN 1396, 4.3, PG II
Restrictions: Passenger Aircraft = 15 kg; Cargo Only Aircraft = 50 kg.

SECTION XV. Regulatory Information

US Federal Regulations

All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation which will meet this requirement.

CERCLA HAZARDOUS SUBSTANCES: (40 CFR 302.4) See below.

TSCA STATUS: All components of this product are listed on the TSCA inventory.

SARA TITLE III: Section 311/312 Hazardous Categories:

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Aluminum (7429-90-5)

SARA 313: Form R reporting required for 1.0% de minimis concentration (fume or dust only)

Copper (7440-50-8)

SARA 313: Form R reporting required for 1.0% de minimis concentration

CERCLA: Final RQ 5000 pounds (2270 kg) (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

Zinc (7440-66-6)

SARA 313: Form R reporting required for 1.0% de minimis concentration (only fume or dust)

CERCLA: Final RQ = 1000 pounds (454 kg) (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is equal to or exceeds 0.004 inches)

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Nickel (7440-02-0)

SARA 313: Form R reporting required for 0.1% de minimis concentration

CERCLA: Final RQ = 100 pounds (45.4 kg) (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches.

Manganese (7439-96-5)

SARA 313: form R reporting required for 1.0% de minimis concentration

Chromium (7440-47-3)

SARA 313: Form R reporting required for 1.0% de minimis concentration

CERLA: Final RQ = 5000 pounds (2270 kg) (no reporting of releases of this hazardous material is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

Beryllium (7440-41-7)

SARA 313: Form R reporting required for 0.1% de minimis concentration

CERLA: Final RQ = 10 pounds (4.54 kg) (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

SARA 311/312 Physical and Health Hazard Categories:

Immediate (acute) Health Hazard: Yes, if particulates/fumes generated during processing.

Delayed (chronic) Health Hazard: Yes, if particulates/fumes generated during processing.

Fire Hazard: No

Sudden Release of Pressure: No

Reactive: Yes, if molten

State Regulations

A. General Product Information

Pennsylvania” Special Hazardous Substances”: Chromium, Chromium compounds, hexavalent, Nickel. **Chemicals known to the State of California to cause cancer:** Chromium (hexavalent compounds), Cobalt metal powder, Nickel and certain nickel compounds, Lead and lead compounds. **Chemical(s) known to the State of California to cause reproductive/development effects:** Lead.

B: Component Analysis-State

The following components appear on one or more of the Sate Hazardous Substances Lists:

CAS #	Component	CA	FL	MA	MN	NJ	PA
7429-90-5	Aluminum	Yes	No	Yes	Yes	Yes	Yes
7440-21-3	Silicon	No	No	Yes	Yes	Yes	Yes
7440-50-8	Copper	Yes	No	Yes	Yes	Yes	Yes
7440-66-6	Zinc	Yes	No	Yes	No	Yes	Yes
7439-95-4	Magnesium	Yes	No	Yes	No	Yes	Yes
7440-02-0	Nickel	Yes	No	Yes	Yes	Yes	Yes
7439-89-6	Iron	Yes	No	No	No	No	No
7439-96-5	Manganese	Yes	No	Yes	Yes	Yes	Yes
7440-31-5	Tin	No	No	No	No	No	No
7440-47-3	Chromium	Yes	No	Yes	Yes	Yes	Yes
7440-41-7	Beryllium	Yes	No	No	No	Yes	No

7440-32-6	Titanium	No	No	No	No	No	No
7439-92-1	Lead	Yes	No	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California State Drinking Water and Toxic Enforcement Act of 1986. (Proposition 65)

Warning: This product contains a chemical known to the State of California to cause cancer.
Warning: This product contains a chemical known to the State of California to cause reproductive/developmental effects.

SECTION XVI. Other Information

MSDS HISTORY

Original: August 15, 1997
Revised: September 29, 2005

MSDS CHANGES

Changes in sections II and XV

Material Name: Aluminum & Aluminum Alloys Re-melt Ingot/Billet

INFORMATION RESOURCES USED:

- NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: 800-344-3555)
- NFPA 651, Standard for Manufacture of Aluminum and Magnesium Powder
- NFPA 70, Standard for National Electrical Code
- NFPA 77, Standard for Static Electricity
- Aluminum Associations, "Guidelines for Handling Molten Aluminum," Aluminum Association, 900 19th Street, NW. Washington, DC 20006.
- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 900 19th Street, N.W., Washington, DC 20006.
- Guide to Occupational Exposure Values-1996, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1994.