0946-001-289
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0946-001-291

356-T6 ALLOY ALUMN.

Material Safety Data Sheet

Product Name: REMELT INGOT AND CAST ALUMINUM PRODUCTS, 3xx.x SERIES ALLOYS ID: 684

* * * Section 1 - Chemical Product and Company Identification * * *

Chemical Formula: Mixture
Product Use: Various fabricated aluminum parts and products.
Other Designations: Granulated, pebbled, aluminizing, foundry-rich alloy, rotor, remelt scrap ingot (RSI), 3xx.x Series Alloys, A356.0, A356.2, A356.2N, A356.2S, A356.2Sr, A357.2S, A360.1, A360.2, A380, A380.1, B319.1S, CE40, CE66, CH62, CK26, CR37, CR80, CZ29, C3, C65B, C65D, C66D, C68D, C69D, C62E, C23F, C24F, C37F, C57F, C62J, C63J, C67J, C60K, C62K, C64K, C65K, C66K, C62M, C64M, C69M, C60N, C61N, C62N, C63N, C119, C253, C264, C277, C355.2N, C355.2, C355.2S, C377, C380, C391, C394, C401, C402, C437, C448, C453, C470, C487, C514, C576, C580, C605, C606, C612, C613, C625, C626, C633, C644, C650, C652, C653, C656, C660, C661, C698, F356.2, F356.2S, NA380.1, RA2, RA117, RA158, RA161, RA176, RA183, RA193, RA194, RA198, RA205, RA207, RA225, RA227, RA234, RA237, RA243, RA251, RA267, RA272, RA276, RA283, RA284, RA285, RA286, RA288.
Does not include some variations of A357.0, A357.2, C357.0, C357.2, D357.0, 358.0, 358.2, 364.0, 364.2 and CM56. (See Alcoa MSDS No. 303).

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* * * Section 2 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
7429-90-5	Aluminum	>70
7440-21-3	Silicon	<23.1
7440-50-8	Copper	<6.1
7440-02-0	Nickel	<5.1
7440-66-6	Zinc	<4.6
7439-89-6	Iron	<2.6
7440-45-1	Cerium	<2.1
7439-95-4	Magnesium	<1.6
7439-96-5	Manganese	<1.6
7440-48-4	Cobalt	<1.1
7440-47-3	Chromium	<0.6
7439-92-1	Lead	0-0.20

Component Information
Additional compounds which may be formed during processing are listed in Section 8.

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* * * Section 3 - Hazards Identification * * *

Emergency Overview

Solid. Silvery. Odorless. Non-combustible. Small chips, fine turnings and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information):
* Dust or fines are dispersed in the air.
* Chips, dust or fines are in contact with water.
* Dust or fines are in contact with certain metal oxides (e.g. rust).
* Molten metal is 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 and lung disease.

Potential Health Effects

(If dusts or fumes are generated by processing)

Eyes

Can cause irritation.

Skin

Can cause irritation and sensitization.

Inhalation

Can cause irritation of upper respiratory tract, metal fume fever and other health effects listed below. Cancer hazard.

Health Effects of Ingredients

Chromium dust and mist Can cause irritation of eyes, skin and respiratory tract. **Chromium and trivalent chromium** IARC/NTP: Not classified by IARC.

Nickel dust and fumes Can cause irritation of eyes, skin and respiratory tract. Eye contact: Can cause inflammation of the eyes and eyelids (conjunctivitis). Skin contact: Can cause sensitization and allergic contact dermatitis. Chronic overexposures: Can cause perforation of the nasal septum, inflammation of the nasal passages (sinusitis), respiratory sensitization, asthma and scarring of the lungs (pulmonary fibrosis). **Nickel metal** IARC/NTP: Listed as "reasonably anticipated to be a human carcinogen" by the NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Lead dust or fume Can cause irritation of eyes and upper respiratory tract. Acute overexposures: Can cause nausea and muscle cramps. Chronic overexposures: Can cause weakness in the extremities (peripheral neuropathy), abdominal cramps and other gastrointestinal tract effects, kidney damage, liver damage, central nervous system damage, damage to blood forming organs, blood cell damage and reproductive harm. Can cause reduced fertility and fetal toxicity in pregnant women. **Certain inorganic lead compounds:** IARC/NTP: Listed as "reasonably anticipated to be a human carcinogen" by the NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Copper fume Can cause irritation of eyes, mucous membranes and respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). **Copper dust and mists** Can cause irritation of eyes, mucous membranes, skin and respiratory tract. Chronic overexposures: Can cause reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes) and hair discoloration.

Silicon, inert dusts Chronic overexposures: Can cause chronic bronchitis and narrowing of the airways. Additional information: Studies with experimental animals by injection have found lesions on the lungs.

Cobalt Can cause irritation of eyes, skin and respiratory tract. Skin contact: Can cause allergic reactions. Acute and chronic overexposures: Can cause respiratory sensitization, asthma, scarring of the lungs (pulmonary fibrosis) and damage to the heart muscle (cardiomyopathy). **Cobalt and cobalt compounds** IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Cerium Can cause irritation of eyes and skin. Chronic overexposures: Can cause lung damage. **Cerium compounds** Studies with experimental animals by ingestion have found acute toxicity. **Cerium oxide** Studies with experimental animals (rats, 50 mg.) by inhalation have not found lung damage.

Manganese dust or fumes Chronic overexposures: Can cause inflammation of the lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Aluminum dust, fines and fumes Low health risk by inhalation. Generally considered to be biologically inert (milling, cutting, grinding).

Health Effects Of Additional Compounds That May Be Formed During Processing

Hexavalent chromium (Chrome VI) Can cause irritation of eyes, skin and respiratory tract. Skin contact: Can cause irritant dermatitis, allergic reactions and skin ulcers. Chronic overexposures: Can cause perforation of the nasal septum, respiratory sensitization, asthma, fluid in the lungs (pulmonary edema), lung damage, kidney damage, lung cancer, nasal cancer and cancer of the gastrointestinal tract. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Nickel compounds Associated with lung cancer, cancer of the vocal cords and nasal cancer. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Magnesium oxide fumes Can cause irritation of eyes and respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever).

Manganese oxide fumes Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever).

Zinc oxide fumes Can cause irritation of upper respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). **Zinc oxide dust** Expected to be a low health risk by inhalation.

Iron oxide Chronic overexposures: Can cause benign lung disease (siderosis). Ingestion: Can cause irritation of gastrointestinal tract, bleeding, changes in the pH of the body fluids (metabolic acidosis) and liver damage.

Silica, amorphous Acute overexposures: Can cause dryness of eyes, nose and upper respiratory tract.

Alumina (aluminum oxide) Low health risk by inhalation. Generally considered to be biologically inert.

Welding, plasma arc cutting, and arc spray metalizing can generate ozone. **Ozone** Can cause irritation of eyes, nose and upper respiratory tract. Acute overexposures: Can cause shortness of breath, tightness of chest, headache, cough, nausea and narrowing of airways. Effects are reversible on cessation of exposure. Acute overexposures (high concentrations): Can cause respiratory distress, respiratory tract damage, bleeding and fluid in the lungs (pulmonary edema). Effects can be delayed up to 1-2 hours. Additional information: Studies with experimental animals by inhalation have found genetic damage, reproductive harm, blood cell damage, lung damage and death.

Welding fumes IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)* Additional Information: In one study, occupational asthma was associated with exposures to fumes from aluminum welding.

Plasma arc cutting can generate oxides of nitrogen. **Oxides of nitrogen (NO and NO_2)** Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause reduced ability of the blood to carry oxygen (methemaglobin). Can cause cough, shortness of breath, fluid in the lungs (pulmonary edema) and death. Effects may be delayed up to 2-3 weeks. **Nitrogen dioxide (NO_2)** Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis).

***IARC Classification Definitions**

Group 1: The agent is carcinogenic to humans. There is sufficient evidence that a causal relationship existed between exposure to the agent and human cancer.
Group 2B: The agent is possibly carcinogenic to humans. Generally includes agents for which there is limited evidence in the absence of sufficient evidence in experimental animals.

Medical Conditions Aggravated By Exposure to the Product

Asthma, chronic lung disease, skin rashes and secondary Parkinson's disease.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

First Aid: Skin

Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists.

First Aid: Inhalation

Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

* * * Section 5 - Fire Fighting Measures * * *

Flammable/Combustible Properties

This product does not present fire or explosion hazards as shipped. Small chips, turnings, dust and fines from processing may be readily ignitable.

Fire/Explosion

May be a potential hazard under the following conditions:

* Dust or fines dispersed in the air can be explosive. Even a minor dust cloud can explode violently.

* Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas could present an explosion hazard in confined or poorly ventilated spaces.

* Dust or fines in contact with certain metal oxides (e.g., rust). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.

* Molten metal in contact with water/moisture or other metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermite reactions/explosions.

Extinguishing Media

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

Fire Fighting Equipment/Instructions

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

* * * Section 6 - Accidental Release Measures * * *

Small/Large Spill

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 aluminum. Allow the spill to cool before remelting as scrap.

* * * Section 7 - Handling and Storage * * *

Handling/Storage

Product should be kept dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red.

Requirements for Processes Which Generate Dusts or Fumes

If processing of these products includes operations where dust or extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) brochures listed in Section 16. Cover and reseal partially empty containers. Use non-sparking handling equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during dust handling and transfer operations. (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Avoid all ignition sources. Good housekeeping practices must be maintained.

Requirements for Remelting of Scrap Material and/or Ingot

Molten metal 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 or contained in scrap or remelt 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. If confined, even a few drops of water can lead to violent explosions.

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

Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:
* Inspect all 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 or heavy items such as ingot adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Engineering Controls

Use with adequate explosion-proof ventilation to meet the limits listed in Section 8, Exposure Guidelines.

Personal Protective Equipment

Respiratory Protection

Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8, Exposure Guidelines. Suggested respiratory protection: N95, N100 for lead

Eye Protection

Wear safety glasses/goggles to avoid eye contact.

Skin Protection

Wear appropriate gloves to avoid direct skin contact.

General

Sampling to establish **lead** exposures is advised where exposures to airborne particulate or fumes are possible. Consult OSHA Lead Standard 29 CFR 1910.1025 for specific health/industrial hygiene precautions and requirements to follow when handling lead compounds.

Personnel who handle and work with **molten metal** should utilize primary protective clothing like face shields, fire resistant tapper's jackets, leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal.

Exposure Guidelines

A: General Product Information

Alcoa recommends an Occupational Exposure Limit for chromium (VI) compounds [both soluble and insoluble forms] of 0.25 ug/m3 TWA as chromium.

Alcoa recommends an Occupational Exposure Limit for Nickel Compounds of 0.1 mg/m3 TWA.

Alcoa recommends Occupational Exposure Limits for Manganese of 0.05 mg/m3 TWA (total particulate) and 0.02 mg/m3 TWA (respirable fraction).

B: Component Exposure Limits

Aluminum (7429-90-5)

ACGIH 10 mg/m3 TWA (metal dust)
OSHA 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Silicon (7440-21-3)

ACGIH 10 mg/m3 TWA
OSHA 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Copper (7440-50-8)

ACGIH 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists, as Cu)
OSHA 0.1 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists)

Nickel (7440-02-0)

ACGIH 1.5 mg/m3 TWA (inhalable fraction)
OSHA 1 mg/m3 TWA

Manganese (7439-96-5)

ACGIH 0.2 mg/m3 TWA
OSHA 5 mg/m3 Ceiling (fume)

Cobalt (7440-48-4)

ACGIH 0.02 mg/m3 TWA
OSHA 0.1 mg/m3 TWA (dust and fume)

Chromium (7440-47-3)

ACGIH 0.5 mg/m3 TWA
OSHA 1 mg/m3 TWA

Lead (7439-92-1)

ACGIH 0.05 mg/m3 TWA
OSHA 50 µg/m3 PEL (as Pb); 30 µg/m3 Action Level (as Pb. Poison - see 29 CFR 1910.1025)

C: Exposure Limits for Additional Compounds Which May Be Formed During Processing

Alumina (non-fibrous) (1344-28-1)
ACGIH 10 mg/m3 TWA (particulate matter containing no asbestos and < 1% crystalline silica)
OSHA 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Silica fume (amorphous) (69012-64-2)
ACGIH 2 mg/m3 TWA (respirable fraction)

Zinc oxide (1314-13-2)
ACGIH 2 mg/m3 TWA (respirable fraction)
ACGIH 10 mg/m3 STEL (respirable fraction)
OSHA 5 mg/m3 TWA (fume); 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Magnesium oxide fume (1309-48-4)
ACGIH 10 mg/m3 TWA (inhalable fraction)
OSHA 15 mg/m3 TWA (total particulate)

Manganese inorganic compounds (Not Available)
ACGIH 0.2 mg/m3 TWA (as Mn)
OSHA 5 mg/m3 Ceiling (as Mn)

Nickel insoluble compounds (Not Available)
ACGIH 0.2 mg/m3 TWA (inhalable fraction, as Ni)
OSHA 1 mg/m3 TWA (as Ni) (related to Nickel insoluble compounds)

Iron oxide (1309-37-1)
ACGIH 5 mg/m3 TWA (dust and fume, as Fe)
OSHA 10 mg/m3 TWA

Chromium (II) compounds (Not Available)
OSHA 0.5 mg/m3 TWA (as Cr)

Chromium (III) compounds (as Cr) (Not Available)
ACGIH 0.5 mg/m3 TWA (as Cr)
OSHA 0.5 mg/m3 TWA (as Cr)

Chromium (VI) compounds- water soluble (Not Available)
ACGIH 0.05 mg/m3 TWA (as Cr)

Chromium (VI) compounds (certain water insoluble forms) (Not Available)
ACGIH 0.01 mg/m3 TWA (as Cr)

Chromic acid and chromates (7738-94-5)
OSHA 0.1 mg/m3 Ceiling (and chromates)

Welding fumes (NOC) (Not Available)
ACGIH 5 mg/m3 TWA

Ozone (10028-15-6)
ACGIH 0.05 ppm TWA (heavy work); 0.08 ppm TWA (moderate work); 0.10 ppm TWA (light work); 0.20 ppm TWA (heavy, moderate or light work, less than or equal to 2 hours)
OSHA 0.1 ppm TWA; 0.2 mg/m3 TWA

Nitrogen dioxide (10102-44-0)
ACGIH 3 ppm TWA
ACGIH 5 ppm STEL
OSHA 5 ppm Ceiling; 9 mg/m3 Ceiling

Nitric oxide (10102-43-9)
ACGIH 25 ppm TWA
OSHA 25 ppm TWA; 30 mg/m3 TWA

* * * Section 9 - Physical & Chemical Properties * * *

Physical State:	Solid	**Appearance:**	Silvery
Boiling Point:	Not applicable	**Melting Point:**	Range: generally 900-1220°F (482-660°C)
Vapor Pressure:	Not applicable	**Vapor Density:**	Not applicable
Solubility in Water:	None	**Specific Gravity:**	See Density
Density:	Range: generally 2.50-3.12 g/cm3 (0.090-0.113 lb/in3)	**pH Level:**	Not applicable
Odor:	None	**Odor Threshold:**	Not applicable
Octanol-Water Coefficient:	Not applicable		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Stability

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

Conditions to Avoid

Chips, fines, dust and molten metal are considerably more reactive with the following:

* **Water:** Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased particularly 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) particularly 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 but not limited to the following 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 11 - Toxicological Information * * *

Health Effects of Ingredients

A: General Product Information

No information available for product.

B: Component Analysis - LD50/LC50

Oral LD50 Rat: 3160 mg/kg

Iron (7439-89-6)

Oral LD50 Rat: 30 g/kg

Manganese (7439-96-5)

Oral LD50 Rat: 9 g/kg

Cobalt (7440-48-4)

Carcinogenicity

A: General Product Information

No information available for product.

B: Component Carcinogenicity

Nickel (7440-02-0)

ACGIH	A5 - Not Suspected as a Human Carcinogen
IARC	Monograph 49, 1990
NTP	Reasonably Anticipated To Be A Carcinogen

Cobalt (7440-48-4)

ACGIH	A3 - Animal Carcinogen
IARC	Monograph 52, 1991 (Evaluated as a group)

Chromium (7440-47-3)

ACGIH	A4 - Not Classifiable as a Human Carcinogen
IARC	Monograph 49, 1990

Lead (7439-92-1)

ACGIH	A3 - Animal Carcinogen
IARC	Supplement 7, 1987; Monograph 23, 1980 (Evaluated as a group)

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

No information available for product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Copper (7440-50-8)

96 Hr LC50 fathead minnow: 23 µg/L;96 Hr LC50 rainbow trout: 13.8 µg/L;96 Hr LC50 bluegill: 236 µg/L

72 Hr EC50 freshwater algae (Scenedesmus subspicatus): 120 µg/L

[illegible]

Nickel (7440-02-0)

96 Hr LC50 rainbow trout (adults):31.7 mg/L;96 Hr LC50 fathead minnow: 3.1 mg/L

72 Hr EC50 freshwater algae (4 species): 0.1 mg/L

96 Hr LC50 water flea: 510 µg/L

Zinc (7440-66-6)

96 Hr LC50 fathead minnow: 6.4 mg/L

[illegible]

72 Hr LC50 water flea: 5 µg/L

Lead (7439-92-1)

96 Hr LC50 brook trout: 4.1 mg/L;96 Hr LC50 fathead minnow: 6.5 mg/L

48 Hr LC50 water flea: 600 µg/L

Environmental Fate

No information available for product.

*** Section 13 - Disposal Considerations ***

Disposal Instructions

Reuse or recycle material whenever possible. Material may be disposed of at an industrial landfill.

US EPA Waste Number & Descriptions

A: General Product Information

RCRA Status: Must be determined at time material is disposed. If material is disposed as waste, it must be characterized under RCRA according to 40 CFR, Part 261, or state equivalent in the U.S.

B: Component Waste Numbers

[illegible]

CFR 261 or state equivalent in the U.S.

* * * Section 14 - Transportation Information * * *

Special Transportation

	PSN #1	PSN #2	PSN #3	PSN #4
Notes:	(1)			
Proper Shipping Name:	Not regulated			
Hazard Class:	-			
UN/NA Number:	-			
Packing Group:	-			
RQ:	-			
Other - Tech Name:	-			
Other - Marine Pollutant:	-			

Notes:

(1) When "Not regulated," enter the proper freight classification, "MSDS Number," and "Product Name" on the shipping papers.

Canadian TDG Hazard Class & PIN:	Not regulated

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

A: General Product Information

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 that will meet this requirement.

B: 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: 1.0 percent de minimis concentration (fume or dust only)

Copper (7440-50-8)

SARA 313: 1.0 percent de minimis concentration

CERCLA: 5000 lb final RQ (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); 2270 kg final RQ (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)

Nickel (7440-02-0)

SARA 313: 0.1 percent de minimis concentration

CERCLA: 100 lb final RQ (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); 45.4 kg final RQ (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: 1.0 percent de minimis concentration (only fume or dust)

CERCLA: 1000 lb final RQ (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); 454 kg final RQ (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: 1.0 percent de minimis concentration

Cobalt (7440-48-4)

SARA 313: 0.1 percent de minimis concentration

.Chromium (7440-47-3)

CERCLA: 5000 lb final RQ (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); 2270 kg final RQ (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)

Lead (7439-92-1)

SARA 313: 100 lb Reporting Threshold (PBT Chemical)

CERCLA: 10 lb final RQ (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); 4.54 kg final RQ (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

Reactivity: No (Pure)

State Regulations

A: General Product Information

PENNSYLVANIA "Special Hazardous Substance": Chromium, Chromium compounds, hexavalent, Nickel powder, Nickel and certain nickel compounds, Lead and lead compounds.

Chemical(s) known to the State of California to cause cancer: Chromium (hexavalent compounds), Certain nickel powder, Nickel and certain nickel compounds, Lead and lead compounds.

Chemical(s) known to the State of California to cause reproductive/developmental effects: Lead.

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Aluminum	7429-90-5	Yes	No	Yes	Yes	Yes	Yes
Boron	7440-42-8	No	No	Yes	No	Yes	Yes
Copper	7440-50-8	Yes	No	Yes	Yes	Yes	Yes
Nickel	7440-02-0	Yes	No	Yes	Yes	Yes	Yes
Zinc	7440-66-6	Yes	No	Yes	No	Yes	Yes
Iron	7439-89-6	Yes	No	No	No	No	No
Cerium	7440-45-1	No	No	No	No	Yes	No
Manganese	7439-96-5	Yes	No	Yes	Yes	Yes	Yes
Magnesium	7439-95-4	Yes	No	Yes	No	Yes	Yes
Cobalt	7440-48-4	Yes	No	Yes	Yes	Yes	Yes
Chromium	7440-47-3	Yes	No	Yes	Yes	Yes	Yes
Lead	7439-92-1	Yes	No	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe 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.

Other Regulations

A: General Product Information

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals. Material meets the criteria for inclusion in Virginia Class II.

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Aluminum	7429-90-5	1 % (English Item 47, French Item 181)
Copper	7440-50-8	1 % (English Item 433, French Item 578)
Nickel	7440-02-0	0.1 % (English Item 1126, French Item 1193)
Manganese	7439-96-5	1 % (English Item 874, French Item 1077)
Cobalt	7440-48-4	0.1 % (English Item 417, French Item 566)

C: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS	AUST.	MITI
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	No
Silicon	7440-21-3	Yes	Yes	Yes	Yes	No
Copper	7440-50-8	Yes	Yes	Yes	Yes	No
Nickel	7440-02-0	Yes	Yes	Yes	Yes	No
Zinc	7440-66-6	Yes	Yes	Yes	Yes	No
Iron	7439-89-6	Yes	Yes	Yes	Yes	No
Cerium	7440-45-1	Yes	Yes	Yes	Yes	No
Manganese	7439-96-5	Yes	Yes	Yes	Yes	No
Magnesium	7439-95-4	Yes	Yes	Yes	Yes	No
Titanium	7440-32-6	Yes	Yes	Yes	Yes	No
Chromium	7440-47-3	Yes	Yes	Yes	Yes	No
Lead	7439-92-1	Yes	Yes	Yes	Yes	Yes

Note: Pure metals are not specifically listed by CAS or MITI number. The class of compounds for each of these metals is listed on the MITI inventory.

Section 16 - Other Information

MSDS History

Original: March 15, 1999
Supersedes: May 8, 2003
Revised: March 15, 2004

MSDS Status

Changes in Section 1 and 8. Reviewed on a periodic basis in accordance with Alcoa policy.

Prepared By

Hazardous Materials Control Committee
Prepared: 03/15/04, 412-553-2200

MSDS System Number

115672

Other Information

* 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.
* Aluminum Association, "Guidelines for Handling Molten Aluminum. The Aluminum Association, 900 19th Street, N.W., Washington, DC 20006.
* 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 (Electrical Equipment, Grounding and Bonding)
* NFPA 77, Standard for Static Electricity
* Guide to Occupational Exposure Values-2003, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
* Threshold Limit Values and Biological Exposure Indices, 2004, 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.

* Dangerous Properties of Industrial Materials, Sax, N. Irving, Van Nostrand Reinhold Co., Inc., 1984.
* Patty's Industrial Hygiene and Toxicology: Volume II: Toxicology, 4th ed., 1994, Patty, F. A.; edited by Clayton, G. D. and Clayton, F. E.: New York: John Wiley & Sons, Inc.

Key Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	Environmental Protection Act
LC_{50}	Lethal concentration (50 percent kill)
LC_{Lo}	Lowest published lethal concentration
LD_{50}	Lethal dose (50 percent kill)
LFL	Lower Flammable Limit
MITI	Ministry of International Trade & Industry
NFPA	National Fire Protection Association
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PSN	Proper Shipping Name
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
UFL	Upper Flammable Limit
WHMIS	Workplace Hazardous Materials Information System
atm	atmosphere
g, gm	gram
in	inch
kg	kilogram
lb	pound
mg	milligram
ml, ML	milliliter
mm	millimeter
n.o.s.	not otherwise specified
ppb	parts per billion
ppm	parts per million
psia	pounds per square inch absolute
ug	microgram

INFORMATION HEREIN IS GIVEN IN GOOD FAITH AS AUTHORITATIVE AND VALID; HOWEVER, NO

This is the end of MSDS # 684

REMELT INGOT AND CAST ALUMINUM PRODUCTS

3xx.x SERIES ALLOYS

⚠ WARNING

Hazards: Surface or entrapped moisture and other forms of contamination can cause violent reaction or explosion if ingot is submerged in molten metal. Ingot must be thoroughly preheated and dried prior to charging.

Small chips, fine turnings and dust may ignite readily. Explosion potential may be present when: (1) dusts or fines are dispersed in the air, (2) fines, dust or molten aluminum are in contact with certain metal oxides or (3) chips, fines, dust or molten aluminum are in contact with water or moisture.

Overexposures to lead dusts or fumes (fine dusts), by inhalation or ingestion, can cause

Overexposures to cobalt dust can cause respiratory sensitization (asthma) and damage to the heart and lungs.

Chronic overexposure to manganese dust can cause central nervous system damage, possible of the lungs and reproductive harm in males.

Overexposure to fumes (fine dusts) of copper, magnesium oxide, manganese oxide and zinc oxide may cause metal fume fever by inhalation. Chronic overexposure to copper may cause skin and hair discolorations and blood disorders (anemia).

Chronic inhalation of cerium dust may cause lung damage.

Overexposure to dust or fume (fine dusts) containing nickel and hexavalent chromium compounds may cause nasal and/or lung cancer.

Chronic overexposure to iron oxide dust or fume may cause benign lung disease (siderosis). Chronic overexposure to silicon dust can cause chronic bronchitis.

nickel compounds. Lead and lead compounds are chemicals known to the State of California to cause cancer. Lead is known to cause reproductive toxicity (Proposition 65).

appropriate personal protective equipment (safety glasses/gloves) to avoid injury. Use appropriate NIOSH approved respiratory protection (N95, N100 for lead) if concentrations exceed the permissible limits.

First Aid: EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician. SKIN: Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists. INHALATION: Remove to fresh air. If unconscious or severely injured, check

Consult a physician.

Read Alcoa Material Safety Data Sheet No. 684 for more information about use and disposal.

INGREDIENTS:	CAS No:	INGREDIENTS:	CAS No:
Aluminum	(7429-90-5)	Cerium	(7440-45-1)
Copper	**(7440-50-8)**	**Manganese**	**(7439-96-5)**
Nickel	(7440-02-0)	Cobalt	(7440-48-4)
Zinc	(7440-66-6)	Chromium	(7440-47-3)

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ALCOA