

## MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

Material Name REMELT INGOT AND CAST ALUMINUM PRODUCTS, 5xx.x SERIES ALLOYS

MSDS Number 686 Chemical Formula Mixture

**Product use** Various fabricated aluminum parts and products

**Synonym(s)** 5xx.x series alloys \* Granulated, pebbled, aluminizing, foundry-rich alloy, rotor, remelt scrap ingot

(RSI) \* C240F, C241F, C242F, C243F, C268F, C272F, C277F, C337F, C338F, C446, C577, C604,

C607, C608, C610, C68K, C69K

**Manufacturer information** Alcoa Inc.

201 Isabella Street

Pittsburgh, PA 15212-5858 US Health and Safety: +1-412-553-4649

**Emergency Information** 

USA: Chemtrec: +1-703-527-3887 +1-800-424-9300 ALCOA: +1-412-553-4001

**Website**For a current Material Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or Internally at my.alcoa.com EHS Community

## 2. Hazards Identification

**Emergency overview** 

Solid. Silver colored. Odorless. Non-combustible as supplied. 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 air.

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

• Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).

• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust and fumes from processing: Can cause irritation of the eyes, skin and respiratory tract.

#### **Potential health effects**

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

**Eyes** Dust and fumes from processing: Can cause irritation.

**Skin** Dust and fumes from processing: Can cause irritation. Prolonged or repeated skin contact may

cause sensitization and allergic contact dermatitis.

**Inhalation** Health effects from mechanical processing (e.g., cutting, grinding):

Dust from processing: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause respiratory sensitization, scarring of the lungs (pulmonary fibrosis), central nervous

system damage, secondary Parkinson's disease and reproductive harm in males.

Additional health effects from elevated temperature processing (e.g., welding, melting): Dust and fumes from processing: Can cause irritation of the respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise), the accumulation of fluid in the lungs (pulmonary edema) and reduced ability of the blood to carry oxygen (methemaglobin). Chronic overexposures: Can cause respiratory

sensitization, scarring of the lungs (pulmonary fibrosis) and lung cancer.

Carcinogenicity and Reproductive Hazard Product as shipped: Does not present any cancer or reproductive hazards.

Dust from mechanical processing: Can present a cancer hazard (Lead, Nickel). Can present a

reproductive hazard (Lead, Manganese).

Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (Hexavalent chromium compounds, Lead compounds, Nickel compounds, Welding fumes). Can

present a reproductive hazard (Lead compounds, Manganese compounds).

Medical conditions aggravated by exposure to product

Dust and fumes from processing: Asthma, chronic lung disease, Secondary Parkinson's disease and

skin rashes.

## 3. Composition / Information on Ingredients

**Composition comments** 

Complete composition is provided below and may include some components classified as non-hazardous.

Components	CAS#	Percent
Aluminum	7429-90-5	>85
Magnesium	7439-95-4	<10.8
Zinc	7440-66-6	<2.3
Silicon	7440-21-3	<2.6
Iron	7439-89-6	<1.9
Manganese	7439-96-5	<1.5
Nickel	7440-02-0	<0.5
Chromium	7440-47-3	<0.4
Lead‡	7439-92-1	0 - 0.05

#### **Additional Information**

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

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

#### 4. First Aid Measures

## First aid procedures

**Eye contact** Dust and fumes from processing: Rinse eyes with plenty of water or saline for at least 15 minutes.

Consult a physician.

**Skin contact**Dust and fumes from processing: Wash with soap and water for at least 15 minutes. Get medical

attention if irritation develops or persists.

**Inhalation** Dust and fumes from processing: Remove to fresh air. Check for clear airway, breathing, and

presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations.

Consult a physician.

## 5. Fire Fighting Measures

# Flammable/Combustible Properties

Fire / Explosion Hazards

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

May be a potential hazard under the following conditions:

- Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
- Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.
- Dust and fines in contact with certain metal oxides (e.g., rust, copper oxide). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
- Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain 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**

Suitable extinguishing media

Use Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and turnings.

Unsuitable extinguishing media

DO NOT USE halogenated extinguishing agents on small chips/fines.

DO NOT USE water in fighting fires around molten metal.

These fire extinguishing agents will react with the burning material.

#### **Protection of firefighters**

Protective equipment for firefighters

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

## 6. Accidental Release Measures

#### Spill or leak procedure

Collect scrap for recycling.

If molten: Contain the flow using dry sand or salt flux as a dam. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

## 7. Handling and Storage

#### **Handling**

Keep material 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 Fines If processing of this product generates dust or if 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.

Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal 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, unless specifically approved for use with flammable/explosive dusts. 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. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Do not use compressed air to remove settled material from floors, beams or equipment.

## Requirements for Remelting of Scrap Material 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, containers, molds and ladles which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. 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 items 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 metal temperature of the coldest item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.

Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

## 8. Exposure Controls / Personal Protection

## **Engineering controls**

Dust and fumes from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

## **Exposure data**

#### **Components**

## **U.S. - OSHA - Specifically Regulated Chemicals**

Lead‡ (7439-92-1) 30 μg/m3 Action Level (Poison, See 29 CFR 1910.1025); 50 μg/m3 TWA

## **Compounds Formed During Processing**

## **U.S. - OSHA - Specifically Regulated Chemicals**

Chromium (VI) compounds (18540-29-9) Lead compounds, inorganic (CASNo. Not available)  $5~\mu g/m3$  TWA (Cancer hazard, See 29 CFR 1910.1026, Cr); 2.5  $\mu g/m3$  Action Level (Cr)  $30~\mu g/m3$  Action Level (Poison, See 29 CFR 1910.1025, Pb); 50  $\mu g/m3$  TWA (Pb)

## **Occupational exposure limits**

#### U.S. - OSHA

Components	Туре	Value	Form
Aluminum (7429-90-5)	TWA	5 mg/m3	(respirable fraction)
	TWA (total dust)	15 mg/m3	(total dust)
Chromium (7440-47-3)	TWA	1 mg/m3	,
Lead‡ (7439-92-1)	TWA	50 μg/m3	
Manganese (7439-96-5)	Ceiling	5 mg/m3	(fume)
Nickel (7440-02-0)	TWA	1 mg/m3	(rame)
Silicon (7440-21-3)	TWA	5 mg/m3	(respirable fraction)
Silicon (7440-21-3)	TWA (total dust)	15 mg/m3	(total dust)
Commounds Formed During Dressesing	,	٥.	•
Compounds Formed During Processing	Туре	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	5 mg/m3	(respirable fraction)
	TWA (total dust)	15 mg/m3	(total dust)
Chromium (II) compounds (CASNo. Not available)	TWA	0.5 mg/m3	(Cr)
Chromium (III) compounds (CASNo. Not available)	TWA	0.5 mg/m3	(Cr)
Chromium (VI) compounds (18540-29-9)	Action	2.5 µg/m3	(as Cr)
	TWA (as Cr)	5 μg/m3	(as Cr)
Iron oxide (1309-37-1)	TWA	10 mg/m3	(fume)
Lead compounds, inorganic (CASNo. Not available)	TWA	50 μg/m3	(Pb)
Magnesium oxide (1309-48-4)	TWA	15 mg/m3	(fume, total particulate)
Manganese compounds, inorganic (CASNo. Not	Ceiling	5 mg/m3	(Mn)
available)	-	-	. ,
Nickel compounds, insoluble (CASNo. Not available)	TWA	1 mg/m3	(Ni)
Nitric oxide (10102-43-9)	TWA	25 ppm	
		30 mg/m3	
Nitrogen dioxide (10102-44-0)	Ceiling	5 ppm	
		9 mg/m3	
Ozone (10028-15-6)	TWA	0.1 ppm	
		0.2 mg/m3	
Zinc oxide (1314-13-2)	TWA	5 mg/m3	(respirable fraction)
Zine oxide (1511-15-2)	TWA (fume)	5 mg/m3	(fume)
	TWA (total dust)	15 mg/m3	(total dust)
	TWA (total dust)	15 mg/ms	(total dust)
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Components	Туре	Value	Form
Aluminum (7429-90-5)	TWA	3 mg/m3	(respirable fraction)
		10 mg/m3	(8 Hour)
Manganese (7439-96-5)	TWA	0.05 mg/m3	(total dust, as Mn)
		0.02 mg/m3	(respirable fraction, as
		5, 5	Mn)
Compounds Formed During Processing	Туре	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	3 mg/m3	(respirable fraction)
		10 mg/m3	(8 Hour)
Chromium (VI) compounds (18540-29-9)	TWA	0.25 ug/m3	(as Cr)
Manganese compounds, inorganic (CASNo. Not available)	TWA	0.05 mg/m3	(total dust, as Mn)
		0.02 mg/m3	(respirable fraction, as Mn)
Nickel compounds, insoluble (CASNo. Not available)	TWA	0.1 mg/m3	(as Ni)
		5.1 mg/m5	(40 111)

#### **ACGIH**

Components	Туре	Value	Form
Aluminum (7429-90-5)	TWA	1 mg/m3	(respirable fraction)
Chromium (7440-47-3)	TWA	0.5 mg/m3	
Lead‡ (7439-92-1)	TWA	0.05 mg/m3	
Manganese (7439-96-5)	TWA	0.2 mg/m3	
Nickel (7440-02-0)	TWA	1.5 mg/m3	(inhalable fraction)
Compounds Formed During Processing	Туре	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	1 mg/m3	(respirable fraction, as Al)
Chromium (III) compounds (CASNo. Not available)	TWA	0.5 mg/m3	(as Cr)
Chromium (VI) compounds, certain water insoluble forms (CASNo. Not available)	TWA	0.01 mg/m3	(as Cr)
Chromium (VI) compounds, water soluble forms (CASNo. Not available)	TWA	0.05 mg/m3	(as Cr)
Iron oxide (1309-37-1)	TWA	5 mg/m3	(respirable fraction)
Lead compounds, inorganic (CASNo. Not available)	TWA	0.05 mg/m3	(Pb)
Magnesium oxide (1309-48-4)	TWA	10 mg/m3	(inhalable fraction)
Manganese compounds, inorganic (CASNo. Not available)	TWA	0.2 mg/m3	(Mn)
Nickel compounds, insoluble (CASNo. Not available)	TWA	0.2 mg/m3	(Ni, inhalable fraction)
Nitric oxide (10102-43-9)	TWA	25 ppm	
Nitrogen dioxide (10102-44-0)	STEL	5 ppm	
	TWA	3 ppm	
Ozone (10028-15-6)	TWA	0.2 ppm	
	TWA (heavy work)	0.05 ppm	(heavy work)
	TWA (light work)	0.1 ppm	
	TWA (moderate work)	0.08 ppm	(moderate work)
Zinc oxide (1314-13-2)	STEL	10 mg/m3	(respirable fraction)
	TWA	2 mg/m3	(respirable fraction)

## **Personal protective equipment**

**Eye / face protection** Wear safety glasses with side shields.

**Skin protection** Wear appropriate gloves to avoid any skin injury.

**Respiratory protection** Dust and fumes from processing: Use NIOSH-approved respiratory protection as specified by an

Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in

Section 8. Suggested respiratory protection: N95, N100 for Lead.

#### **General**

Personnel who handle and work with molten metal should utilize primary protective clothing like polycarbonate face shields, fire resistant tapper's jackets, neck shades (snoods), 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. Synthetic materials should never be worn even as secondary clothing (undergarments).

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

## 9. Physical & Chemical Properties

Form Solid.

**Appearance** Silver colored. **Boiling point** Not determined

**Melting point** 900 - 1200 °F (482.2 - 648.9 °C)

Flash point Not applicable
Auto-ignition temperature Not applicable
Flammability limits in air, Not applicable

lower, % by volume

Flammability limits in air,

Not applicable

upper, % by volume

Vapor pressure Not applicable
Vapor density Not applicable

Solubility (water) Insoluble

**Density** 2.5 - 3.12 g/cm3 (0.090 - 0.113 lb/in3)

pH Not applicable
 Odor
 Partition coefficient (n-octanol/water)
 Not applicable

## 10. Chemical Stability & Reactivity Information

#### **Chemical stability**

**Conditions to avoid** 

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

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 with smaller particles (e.g., fines and dusts). Molten metal can react violently/explosively with water or moisture, 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) when heated or molten.
- Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.q., fines and dusts).
- Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten 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: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).

**Hazardous polymerization** 

Will not occur.

## 11. Toxicological Information

## Health effects associated with ingredients

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

Silicon (inert dusts): Chronic overexposures: Can cause chronic bronchitis and narrowing of airways.

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

Nickel dust and fume: 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 alloys IARC/NTP: Reviewed and not recommended for listing by NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B).

Chromium dust and fumes: Can cause irritation of eye, skin and respiratory tract. Metallic chromium and trivalent chromium: Not classifiable as to their carcinogenicity to humans by IARC.

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, gastrointestinal tract effects, kidney damage, liver damage, central nervous system damage, damage to the blood forming organs, blood cell damage and reproductive harm. Can cause reduced fertility and fetal toxicity in pregnant women. IARC/NTP: Listed as "reasonably anticipated to be a human carcinogen" by the NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B).

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#### Health effects associated with compounds formed during processing

The following could be expected if welded, remelted or otherwise processed at elevated temperatures:

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

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

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

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

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.

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

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).

Chromium (III) compounds: Can cause irritation of eye, skin and respiratory tract. IARC/NTP: Not classifiable as to their carcinogenicity to humans by IARC.

Hexavalent chromium compounds (chromium VI): Can cause irritation of eye, 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, the accumulation of 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).

Lead (inorganic compounds): IARC/NTP: Listed as "reasonably anticipated to be a human carcinogen" by the NTP. Listed as probably carcinogenic to humans by IARC (Group 2A).

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 the accumulation of fluid in the lungs (pulmonary edema). Effects can be delayed up to 1-2 hours. Additional information: Studies (inhalation) with experimental animals 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 of aluminum can generate oxides of nitrogen.

Oxides of nitrogen (NO and NO2): 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, accumulation of fluid in the lungs (pulmonary edema) and death. Effects can be delayed up to 2-3 weeks.

Nitrogen dioxide (NO2): Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis).

Component analysis - LD50 No information available for product.

## Components

#### Toxicology Data - Selected LD50s and LC50s

Iron (7439-89-6) Oral LD50 Rat 984 mg/kg Magnesium (7439-95-4) Oral LD50 Rat 230 mg/kg Manganese (7439-96-5) Oral LD50 Rat 9 g/kg Nickel (7440-02-0) Oral LD50 Rat >9000 mg/kg Silicon (7440-21-3) Oral LD50 Rat 3160 mg/kg

## **Compounds Formed During Processing**

## Toxicology Data - Selected LD50s and LC50s

Aluminum oxide (non-fibrous) (1344-28-1) Oral LD50 Rat >5000 mg/kg Iron oxide (1309-37-1) Oral LD50 Rat >10000 mg/kg

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#### **Compounds Formed During Processing**

#### Toxicology Data - Selected LD50s and LC50s

Nitric oxide (10102-43-9)

Inhalation LC50 Rat 1068 mg/m3 4 h

Nitrogen dioxide (10102-44-0) Inhalation LC50 Rat 88 ppm 4 h; Inhalation LC50 Rat 165 mg/m3 4 h; Inhalation LC50

Rat 220 mg/m3 1 h

Ozone (10028-15-6) Inhalation LC50 Rat 4800 ppb 4 h Zinc oxide (1314-13-2) Oral LD50 Rat >5000 mg/kg

**Carcinogenicity** No information available for product.

#### **Components**

#### **ACGIH - Threshold Limit Values - Carcinogens**

Aluminum (7429-90-5)

A4 - Not Classifiable as a Human Carcinogen
Chromium (7440-47-3)

A4 - Not Classifiable as a Human Carcinogen

Lead‡ (7439-92-1) A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Nickel (7440-02-0) A5 - Not Suspected as a Human Carcinogen

#### IARC - Group 2B (Possibly Carcinogenic to Humans)

Nickel (7440-02-0) Monograph 49 [1990]; Supplement 7 [1987]

#### NTP (National Toxicology Program) - Report on Carcinogens - Reasonably Anticipated to be Human Carcinogens

A1 - Confirmed Human Carcinogen

A1 - Confirmed Human Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A4 - Not Classifiable as a Human Carcinogen A4 - Not Classifiable as a Human Carcinogen

Monograph 49 [1990] (evaluated as a group) Monograph 49 [1990] (evaluated as a group)

A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

as Group 2B on Suppl 7. Now as Group 2A on Monograph 87.)

Monograph 87 [2006]; Supplement 7 [1987] (Lead & inorganic lead compounds evaluated

Lead‡ (7439-92-1) Reasonably Anticipated To Be A Human Carcinogen

#### **Compounds Formed During Processing**

## **ACGIH - Threshold Limit Values - Carcinogens**

Aluminum oxide (non-fibrous) (1344-28-1)

Chromium (III) compounds (CASNo. Not available)

A4 - Not Classifiable as a Human Carcinogen

A4 - Not Classifiable as a Human Carcinogen

Chromium (VI) compounds, certain water insoluble A1 - Confirmed Human Carcinogen forms (CASNo. Not available)

Chromium (VI) compounds, water soluble forms

(CASNo. Not available)

Iron oxide (1309-37-1)

Lead compounds, inorganic (CASNo. Not available)

Magnesium oxide (1309-48-4)

Nickel compounds, insoluble (CASNo. Not available)

Nitrogen dioxide (10102-44-0)

Ozone (10028-15-6)

IARC - Group 1 (Carcinogenic to Humans)

Chromium (VI) compounds (18540-29-9) Nickel compounds, insoluble (CASNo. Not available)

IARC - Group 2A (Probably Carcinogenic to Humans)

Lead compounds, inorganic (CASNo. Not available)

IARC - Group 2B (Possibly Carcinogenic to Humans)
Welding fumes (CASNo. Not available)
Monograph 49 [1990]

NTP (National Toxicology Program) - Report on Carcinogens - Known Human Carcinogens

Chromium (VI) compounds (18540-29-9)

Nickel compounds, insoluble (CASNo. Not available)

Known Human Carcinogen

U.S. - OSHA - Specifically Regulated Carcinogens (1910.1001 to 1910.1096)

Chromium (VI) compounds (18540-29-9) Workers exposed to Cr(VI) are at an increased risk of developing lung cancer - see 29 CFR

1910.1026

## 12. Ecological Information

#### **Ecotoxicity**

#### **Components**

#### **Ecotoxicity - Freshwater Algae Data**

Nickel (7440-02-0) 72 Hr EC50 Pseudokirchneriella subcapitata: 0.18 mg/L; 96 Hr EC50 Pseudokirchneriella

subcapitata: 0.174 - 0.311 mg/L [static]

Zinc (7440-66-6) 96 Hr EC50 Pseudokirchneriella subcapitata: 0.11 - 0.271 mg/L [static]; 72 Hr EC50

Pseudokirchneriella subcapitata: 0.09 - 0.125 mg/L [static]

#### **Ecotoxicity**

#### Components

Nickel (7440-02-0)

**Ecotoxicity - Freshwater Fish Species Data** 

Iron (7439-89-6) 96 Hr LC50 Morone saxatilis: 13.6 mg/L [static]; 96 Hr LC50 Cyprinus carpio: 0.56 mg/L

[semi-static]

Lead‡ (7439-92-1) 96 Hr LC50 Cyprinus carpio: 0.44 mg/L [semi-static]; 96 Hr LC50 Oncorhynchus mykiss:

1.17 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 1.32 mg/L [static] 96 Hr LC50 Brachydanio rerio: >100 mg/L; 96 Hr LC50 Cyprinus carpio: 1.3 mg/L

[semi-static]; 96 Hr LC50 Cyprinus carpio: 10.4 mg/L [static]

Zinc (7440-66-6) 96 Hr LC50 Pimephales promelas: 2.16-3.05 mg/L [flow-through]; 96 Hr LC50 Pimephales

promelas: 0.211-0.269 mg/L [semi-static]; 96 Hr LC50 Pimephales promelas: 2.66 mg/L [static]; 96 Hr LC50 Cyprinus carpio: 30 mg/L; 96 Hr LC50 Cyprinus carpio: 0.45 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio: 7.8 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: 3.5 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 0.24 mg/L

[flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 0.

**Ecotoxicity - Water Flea Data** 

Lead‡ (7439-92-1) 48 Hr EC50 water flea: 600 μg/L

Nickel (7440-02-0) 48 Hr EC50 Daphnia magna: >100 mg/L; 48 Hr EC50 Daphnia magna: 1 mg/L [Static]

Zinc (7440-66-6) 48 Hr EC50 Daphnia magna: 0.139 - 0.908 mg/L [Static]

**Compounds Formed During Processing** 

**Ecotoxicity - Freshwater Fish Species Data** 

Chromium (VI) compounds (18540-29-9) 96 Hr LC50 Pimephales promelas: 36.2 mg/L; 96 Hr LC50 Oncorhynchus mykiss: 7.6 mg/L

**Ecotoxicity - Water Flea Data** 

Chromium (VI) compounds (18540-29-9) 24 Hr EC50 water flea: 435 µg/L

**Environmental Fate** No data available for product.

13. Disposal Considerations

**Disposal instructions** Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be

made according to local or governmental regulations.

**Waste codes** RCRA Status: Must be determined at the point of waste generation. If material is disposed as a

waste, it must be characterized under RCRA according to 40 CFR, Part 261, or state equivalent in

the U.S.

TCLP testing is recommended for chromium and lead.

14. Transport Information

**General Shipping Information** 

Basic shipping description:

UN number -

**Proper shipping name** Not regulated

Hazard class - Packing group -

**General Shipping Notes** 

When "Not regulated", enter the proper freight classification, MSDS Number and Product Name onto the shipping paperwork.

15. Regulatory Information

**US federal regulations** 

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.

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.

#### **Components**

#### U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

Chromium (7440-47-3) 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 larger than 100 micrometers); 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 larger than 100 micrometers)

Lead‡ (7439-92-1)

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 larger than 100 micrometers); 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 larger than 100 micrometers)

Nickel (7440-02-0) 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 larger than 100 micrometers);  $45.4 \, \mathrm{kg}$  final RQ (no reporting of releases of this hazardous substance is required if the diameter

of the pieces of the solid metal released is larger than 100 micrometers)

Zinc (7440-66-6)

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 larger than 100 micrometers); 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 larger than 100 micrometers)

#### U.S. - CERCLA/SARA - Section 313 - Emission Reporting

Aluminum (7429-90-5) 1.0 % de minimis concentration (dust or fume only)

Chromium (7440-47-3) 1.0 % de minimis concentration

Lead‡ (7439-92-1) 0.1 % Supplier notification limit; 0.1 % de minimis concentration (when contained in

stainless steel, brass, or bronze)
1.0 % de minimis concentration

Manganese (7439-96-5) 1.0 % de minimis concentration Nickel (7440-02-0) 0.1 % de minimis concentration

Zinc (7440-66-6) 1.0 % de minimis concentration (dust or fume only)

#### U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

Lead‡ (7439-92-1) 100 lb RT (this lower threshold does not apply to lead when it is contained in stainless

steel, brass or bronze alloy)

#### State regulations

#### Components

## U.S. - California - 8 CCR Section 339 - Director's List of Hazardous Substances

Aluminum (7429-90-5) Present Chromium (7440-47-3) Present Iron (7439-89-6) Present Lead # (7439-92-1) Present Magnesium (7439-95-4) Present Manganese (7439-96-5) Present Nickel (7440-02-0) Present Zinc (7440-66-6) Present

#### U.S. - California - Proposition 65 - Carcinogens List

Lead‡ (7439-92-1) carcinogen, initial date 10/1/92 Nickel (7440-02-0) carcinogen, initial date 10/1/89

#### U.S. - California - Proposition 65 - Developmental Toxicity

Lead‡ (7439-92-1) developmental toxicity, initial date 2/27/87

#### U.S. - California - Proposition 65 - Reproductive Toxicity - Female

Lead‡ (7439-92-1) female reproductive toxicity, initial date 2/27/87

## U.S. - California - Proposition 65 - Reproductive Toxicity - Male

Lead‡ (7439-92-1) male reproductive toxicity, initial date 2/27/87

#### U.S. - Massachusetts - Right To Know List

Aluminum (7429-90-5) Present

Chromium (7440-47-3) Carcinogen; Extraordinarily hazardous

 Lead‡ (7439-92-1)
 Teratogen

 Magnesium (7439-95-4)
 Present

 Manganese (7439-96-5)
 Present

Nickel (7440-02-0) Carcinogen; Extraordinarily hazardous

Silicon (7440-21-3) Present (dust, exempt when encapsulated or if particulates are not present and cannot be

substantially generated through use of the product)

Zinc (7440-66-6) Present

#### **U.S. - Minnesota - Hazardous Substance List**

Aluminum (7429-90-5) Present (dust)

#### State regulations

#### **Components**

#### U.S. - Minnesota - Hazardous Substance List

Chromium (7440-47-3) Present

Lead (7439-92-1) Carcinogen (elemental, inorganic, fume, and dust)

Manganese (7439-96-5) Present Nickel (7440-02-0) Carcinogen Silicon (7440-21-3) Present (dust)

## U.S. - New Jersey - Right to Know Hazardous Substance List

Aluminum (7429-90-5) sn 0054 Chromium (7440-47-3) sn 0432 Lead‡ (7439-92-1) sn 1096 Magnesium (7439-95-4) sn 1136

sn 1155 (dust and fume) Manganese (7439-96-5) Nickel (7440-02-0) sn 1341 (dust and fume) Silicon (7440-21-3) sn 3125 (powder) Zinc (7440-66-6) sn 2021 (dust and fume)

#### U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

Chromium (7440-47-3) Present Nickel (7440-02-0) Present

#### U.S. - Pennsylvania - RTK (Right to Know) List

Aluminum (7429-90-5) Environmental hazard

Chromium (7440-47-3) Environmental hazard; Special hazardous substance

Lead (7439-92-1) Environmental hazard

Magnesium (7439-95-4) Present

Manganese (7439-96-5) **Environmental hazard** 

Nickel (7440-02-0) Environmental hazard; Special hazardous substance

Silicon (7440-21-3)

Zinc (7440-66-6) Environmental hazard

#### Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories** Immediate Hazard - Yes, If particulates/fumes generated during processing

Delayed Hazard - Yes, If particulates/fumes generated during processing

Fire Hazard - No Pressure Hazard - No

Reactivity Hazard - Yes, If molten

#### **Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

**Inventory information** Japan - ENCS Inventory: Pure metals are not specifically listed by CAS or ENCS number. The class of compounds for each of these metals is listed on the ENCS inventory.

## 16. Other Information

**MSDS History** Origination date: March 16, 1990

> Supersedes: April 4, 2007 Revision date: April 29, 2010

ALCOA MSDS US 0686 Version #: 04 Revision date: 04-29-2010 Print date: 04-29-2010 11 / 13 **MSDS Status** April 29, 2010: New format.

April 4, 2007: Reviewed on a periodic basis in accordance with Alcoa policy. Change(s) in Section:

1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14 and 15

March 16, 2004: Reviewed on a periodic basis in accordance with Alcoa policy. Change(s) in

Section: 1 and 8

Prepared By Hazardous Materials Control Committee

Preparer: Jon N. Peace, 412-553-2293/Robert W. Barr, 412-553-2618/Jim Perriello, 480-278-6928

MSDS System Number 115674

#### Other information

• Guide to Occupational Exposure Values 2009, 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, February 2004.
- 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.
- expub, Expert Publishing, LLC., www.expub.com
- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- 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

Key/Legend:

ACGIH American Conference of Governmental Industrial Hygienists

AICS Australian Inventory of Chemical Substances

CAS Chemical Abstract Services

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR Code of Federal Regulations
CPR Cardio-pulmonary Resuscitation
DOT Department of Transportation
DSL Domestic Substances List (Canada)

EC Effective Concentration

ED Effective Dose

EINECS European Inventory of Existing Commercial Chemical Substances

ENCS Japan - Existing and New Chemical Substances

EWC European Waste Catalogue EPA Environmental Protective Agency

IARC International Agency for Research on Cancer

LC Lethal Concentration

LD Lethal Dose

MAK Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"

NDSL Non-Domestic Substances List (Canada)

NIOSH National Institute for Occupational Safety and Health

NTP National Toxicology Program
OEL Occupational Exposure Limit

OSHA Occupational Safety and Health Administration

PIN Product Identification Number PMCC Pensky Marten Closed Cup

RCRA Resource Conservation and Recovery Act SARA Superfund Amendments and Reauthorization Act

SIMDUT Système d'Information sur les Matières Dangereuses Utilisées au Travail

STEL Short Term Exposure Limit

TCLP Toxic Chemicals Leachate Program
TDG Transportation of Dangerous Goods

TLV Threshold Limit Value
TSCA Toxic Substances Control Act
TWA Time Weighted Average

WHMIS Workplace Hazardous Materials Information System

m meter, cm centimeter, mm millimeter, in inch, g gram, kg kilogram, lb pound, μg microgram,

ppm parts per million, ft feet

#### \*\*\* End of MSDS \*\*\*

#### **Disclaimer**

The information in the sheet was written based on the best knowledge and experience currently available.

## REMELT INGOT AND CAST ALUMINUM PRODUCTS, 5xx.x SERIES ALLOYS

Non-combustible as supplied. Small chips, fine turnings and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when: Dust or fines are dispersed in air; Chips, fines or dust are in contact with water; Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide). Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust and fumes from processing: Can cause irritation of the eyes, skin and respiratory tract. Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis.

Health effects from mechanical processing (e.g., cutting, grinding): Chronic overexposures: Can cause respiratory sensitization, scarring of the lungs, central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Additional health effects from elevated temperature processing (e.g., welding, melting): Acute overexposures: Can cause metal fume fever, the accumulation of fluid in the lungs and reduced ability of the blood to carry oxygen. Chronic overexposures: Can cause respiratory sensitization, scarring of the lungs and lung cancer.

**FIRST AID** 

Dust and fumes from processing: Rinse eyes with plenty of water or saline for at Eve contact

least 15 minutes. Consult a physician.

Skin contact Dust and fumes from processing: Wash with soap and water for at least 15

minutes. Get medical attention if irritation develops or persists.

Inhalation Dust and fumes from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for

persons without pulse or respirations. Consult a physician.

**FIRE FIGHTING** 

Suitable

Use Class D extinguishing agents on fines, dust or molten metal. Use coarse extinguishing media water spray on chips and turnings.

Extinguishing media DO NOT USE halogenated extinguishing agents on small chips/fines. which must not be used for safety

DO NOT USE water in fighting fires around molten metal.

These fire extinguishing agents will react with the burning material.

**SPILL PROCEDURES** 

Spill or leak

reasons

Collect scrap for recycling

procedure

If molten: Contain the flow using dry sand or salt flux as a dam. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use.

Allow the spill to cool before remelting as scrap.

HANDLING AND STORAGE

Handling

Keep material 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.

The product is non-dangerous in accordance with Directive 1999/45/EC. See Alcoa Material Safety Data Sheet No. 686 for more information about use and disposal. Emergency Phone: (412) 553-4001

## Contains:

Aluminum	7429-90-5
Magnesium	7439-95-4
Zinc	7440-66-6
Silicon	7440-21-3
Iron	7439-89-6
Manganese	7439-96-5
Nickel	7440-02-0
Chromium	7440-47-3
Lead‡	7439-92-1



201 Isabella Street, Pittsburgh PA 15212-5858 United States

