

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material Name REMELT INGOT AND CAST ALUMINUM PRODUCTS, 2xx.x SERIES ALLOYS

MSDS Number 683 Chemical Formula Mixture

Product use Various fabricated aluminum parts and products

Synonym(s) 2xx.x series alloys * Granulated, pebbled, aluminizing, foundry-rich alloy, rotor, remelt scrap ingot

(RSI) * C266F, C340F, C381, C63S, C67E, C699, C94F

Manufacturer information Alcoa Inc.

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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 fume from processing: Can cause irritation of 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 of the eyes.

Skin Dust or fume from processing: Can cause skin 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 skin abnormalities (pigmentation changes), reduction in the number of red blood cells (anemia), respiratory sensitization, scarring of the lungs (pulmonary fibrosis), central nervous

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

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 Product as shipped: Doc Reproductive Hazard Dust and fumes from m

Product as shipped: Does not present any cancer or reproductive hazards.

Dust and fumes 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, 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.

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3. Composition / Information on Ingredients

Composition comments

Complete composition is provided below and may include some components classified as non-hazardous. Some component information can be found under the following: Manganese compounds.

Components	CAS #	Percent
Aluminum	7429-90-5	>90
Copper	7440-50-8	<5.3
Nickel‡	7440-02-0	0 - 2.3
Magnesium	7439-95-4	<1.8
Iron	7439-89-6	<1
Manganese	7439-96-5	<0.6
Chromium	7440-47-3	<0.3
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.
- ‡ Alloys: C699 and C94F.

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

4. First Aid Measures

First aid procedures

Eve 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.

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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)

 $30 \mu g/m3$ Action Level (Poison, See 29 CFR 1910.1025); $50 \mu g/m3$ TWA

Compounds Formed During Processing

U.S. - OSHA - Specifically Regulated Chemicals

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

Value

Form

Occupational exposure limits

U.S. - OSHA Components

•	, ·		
Aluminum (7429-90-5)	TWA	5 mg/m3	(respirable fraction)
Cl. (7440.47.0)	TWA (total dust)	15 mg/m3	(total dust)
Chromium (7440-47-3)	TWA	1 mg/m3	
Copper (7440-50-8)	TWA	1 mg/m3	(dust and mist)
L 15 (7420 02 1)	TWA (fume)	0.1 mg/m3	(fume)
Lead† (7439-92-1)	TWA	50 μg/m3	(6)
Manganese (7439-96-5)	Ceiling	5 mg/m3	(fume)
Nickel‡ (7440-02-0)	TWA	1 mg/m3	_
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/m2	(Ni)
Nitric oxide (10102-43-9)	TWA	1 mg/m3	(INI)
Mid IC Oxide (10102-43-9)	IWA	25 ppm 30 mg/m3	
Nitrogen dioxide (10102-44-0)	Ceiling	5 ppm	
ivitiogen dioxide (10102-44-0)	Celling	9 mg/m3	
Ozono (10020 1E 6)	TWA	0.1 ppm	
Ozone (10028-15-6)	IVVA	0.1 ppiii 0.2 mg/m3	
Alcoa		3,	
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
		3,	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	0.02 mg/m3	(respirable fraction, as Mn)
available		0.05 mg/m3	(total dust, as Mn)
Nickel compounds, insoluble (CASNo. Not available)	TWA	0.1 mg/m3	(as Ni)
Compounder insoluble (Grieffor Hot dividiable)		0.19/0	(45 111)

Type

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Components	Туре	Value	Form
Aluminum (7429-90-5)	TWA	1 mg/m3	(respirable fraction)
Chromium (7440-47-3)	TWA	0.5 mg/m3	
Copper (7440-50-8)	TWA	1 mg/m3	(Cu, dust and mist)
	TWA (fume)	0.2 mg/m3	(fume)
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)
Tron 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)

Personal protective equipment

Wear safety glasses with side shields. Eye / face protection

Skin protection Wear appropriate gloves to avoid any skin injury.

If dust and fumes are generated through processing: Use NIOSH-approved respiratory protection **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 applicable

Melting point 899.6 - 1200.2 °F (482 - 649 °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) Not applicable

Density 0.09 - 0.113 lb/in3 (2.491 - 3.128 g/cm3)

рH Not applicable Odor Odorless. **Partition coefficient** Not applicable (n-octanol/water)

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.g., 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).

Copper dust/mists: Can cause irritation of the 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.

Nickel dust and fume: Can cause irritation of eyes, skin and respiratory tract. Eye contact: Can cause inflammation of the eyes and evelids (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).

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.

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.

Copper fume: Can cause irritation of the eyes, mucous membranes, 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).

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).

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).

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

Compounds Formed During Processing

Toxicology Data - Selected LD50s and LC50s

 $\begin{array}{lll} \mbox{Aluminum oxide (non-fibrous) (1344-28-1)} & \mbox{Oral LD50 Rat} > 5000 \mbox{ mg/kg} \\ \mbox{Iron oxide (1309-37-1)} & \mbox{Oral LD50 Rat} > 10000 \mbox{ mg/kg} \\ \mbox{Nitric oxide (10102-43-9)} & \mbox{Inhalation LC50 Rat } 1068 \mbox{ mg/m3 4 h} \end{array}$

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

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Compounds Formed During Processing

Toxicology Data - Selected LD50s and LC50s

Ozone (10028-15-6) Inhalation LC50 Rat 4800 ppb 4 h

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

A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

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

Reasonably Anticipated To Be A Human Carcinogen Lead[†] (7439-92-1)

Compounds Formed During Processing

ACGIH - Threshold Limit Values - Carcinogens

Aluminum oxide (non-fibrous) (1344-28-1) A4 - Not Classifiable as a Human Carcinogen Chromium (III) compounds (CASNo. Not available) A4 - Not Classifiable as a Human Carcinogen Chromium (VI) compounds, certain water insoluble A1 - Confirmed Human Carcinogen

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)

forms (CASNo. Not available)

Ozone (10028-15-6)

IARC - Group 1 (Carcinogenic to Humans)

Chromium (VI) compounds (18540-29-9) Monograph 49 [1990] (evaluated as a group) Nickel compounds, insoluble (CASNo. Not available) Monograph 49 [1990] (evaluated as a group)

IARC - Group 2A (Probably Carcinogenic to Humans)

Lead compounds, inorganic (CASNo. Not available)

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

Chromium (VI) compounds (18540-29-9) Known Human Carcinogen 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

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

12. Ecological Information

General Product Information No information available for product.

Ecotoxicity

Components

Ecotoxicity - Freshwater Algae Data

Copper (7440-50-8) 72 Hr EC50 Pseudokirchneriella subcapitata: 0.0426 - 0.0535 mg/L [static]; 96 Hr EC50

Pseudokirchneriella subcapitata: 0.031 - 0.054 mg/L [static]

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

subcapitata: 0.174 - 0.311 mg/L [static]

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Ecotoxicity

Components

Ecotoxicity - Freshwater Fish Species Data

Copper (7440-50-8) 96 Hr LC50 Pimephales promelas: 0.0068 - 0.0156 mg/L; 96 Hr LC50 Pimephales

promelas: <0.3 mg/L [static]; 96 Hr LC50 Pimephales promelas: 0.2 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 0.052 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 1.25 mg/L [static]; 96 Hr LC50 Cyprinus carpio: 0.3 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio: 0.8 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 0.112 mg/L

[flow-through]

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]

Ecotoxicity - Water Flea Data

Nickel[‡] (7440-02-0)

Copper (7440-50-8) 48 Hr EC50 Daphnia magna: 0.03 mg/L [Static]

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]

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: Not federally regulated in the U.S. if disposed of "as is."

RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 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 r

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)

Material name: REMELT INGOT AND CAST ALUMINUM PRODUCTS, 2xx.x SERIES ALLOYS 0683 Version #: 05 Revision date: 04-28-2010 Print date: 04-28-2010

Components

Lead[†] (7439-92-1)

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

Copper (7440-50-8) 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) 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 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)

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
Copper (7440-50-8)

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

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 Copper (7440-50-8) 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

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

 Copper (7440-50-8)
 Present

 Lead† (7439-92-1)
 Teratogen

 Magnesium (7439-95-4)
 Present

 Manganese (7439-96-5)
 Present

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

U.S. - Minnesota - Hazardous Substance List

Aluminum (7429-90-5) Present (dust)
Chromium (7440-47-3) Present

Copper (7440-50-8) Present (dust, fume, and mist)

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

Manganese (7439-96-5) Present
Nickel‡ (7440-02-0) Carcinogen

Material name: REMELT INGOT AND CAST ALUMINUM PRODUCTS, 2xx.x SERIES ALLOYS 0683 Version #: 05 Revision date: 04-28-2010 Print date: 04-28-2010

State regulations

Components

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

Aluminum (7429-90-5) sn 0054 Chromium (7440-47-3) sn 0432 Copper (7440-50-8) sn 0528 Lead[†] (7439-92-1) sn 1096 Magnesium (7439-95-4) sn 1136

Manganese (7439-96-5) sn 1155 (dust and fume) Nickel # (7440-02-0) sn 1341 (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

Environmental hazard (dust and fume) Copper (7440-50-8)

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

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

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

Inventory information

Toxic Substances Control Act (TSCA) Inventory

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

United States & Puerto Rico

MSDS History Origination date: March 16, 1990

Supersedes: March 29, 2007 Revision date: April 28, 2010

MSDS Status April 28, 2010: New format.

> March 29, 2007: Change(s) in Section: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14 and 15. March 15, 2004: Change(s) in Section: 2, 3 and 8. Addition of Silver for alloy 201.

December 12, 2003: 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 115671

Material name: REMELT INGOT AND CAST ALUMINUM PRODUCTS, 2xx,x SERIES ALLOYS

Yes

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, 2xx.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 fume from processing: Can cause irritation of 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 skin abnormalities, reduction in the number of red blood cells, scarring of the lungs, respiratory sensitization, central nervous system damage, secondary Parkinson's disease and reproductive harm. 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 procedure

reasons

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.

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.

See Alcoa Material Safety Data Sheet No. 683 for more information about use and disposal. Emergency Phone: (412) 553-4001

Contains:

Aluminum 7429-90-5 Copper 7440-50-8 Nickel[‡] 7440-02-0 7439-95-4 Magnesium 7439-89-6 Iron Manganese 7439-96-5 Chromium 7440-47-3 Lead† 7439-92-1



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