



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	WROUGHT ALUMINUM PRODUCTS, 7xxx SERIES ALLOYS
SDS Number	669
Version #	08
Revision date	June 4, 2013.
Chemical description	Massive, solid metal.
Product use	Various fabricated aluminum parts and products
Recommended Restrictions	None known.
Synonym(s)	7xxx series alloys * C001D, C04S, C05U, C07U, C104, C10Z, C11T, C13T, C15T, C16B, C16U, C17B, C17Z, C185, C18Z, C19N, C19U, C21B, C21T, C22N, C23T, C25E, C28B, C28H, C31E, C31H, C32Z, C36Z, C38E, C39E, C39N, C405, C40E, C410F, C419F, C41E, C41U, C420F, C42E, C42H, C435F, C436F, C437F, C438F, C43E, C43U, C450F, C453F, C461F, C46E, C46H, C47H, C481F, C48T, C507, C52T, C538, C53T, C53W, C53Z, C545, C549F, C54J, C54T, C550, C551F, C555, C55J, C55P, C55T, C56E, C56J, C56T, C573F, C578F, C57C, C57P, C57T, C57W, C58T, C591F, C595F, C59T, C59Z, C606F, C60Z, C61Z, C622F, C62Z, C7004, C7005, C7010, C7021, C7029, C7039, C7046, C7049, C7050, C7055, C7072, C7072X, C7075, C7076, C7085, C7090, C7093, C70H, C70N, C70P, C70T, C7116, C7129, C7149, C715, C7150, C7150V, C7175, C7178, C71N, C71T, C71W, C7229, C72N, C72P, * C72T, C73N, C73T, C7475, C74N, C75H, C76N, C77E, C77T, C78E, C78H, C78N, C78T, C79E, C79H, C79N, C79S, C79T, C79Z, C80A, C80AA, C80E, C80H, C80T, C81A, C81E, C81H, C81T, C82A, C82E, C82H, C82S, C82T, C83A, C83E, C83H, C83U, C84A, C84E, C84H, C84U, C85E, C85T, C86U, C87N, C89H, C89U, C905F, C90T, C91H, C91T, C92A, C92H, C92N, C92T, C92U, C93T, C93U, C94Z, C96H, C96T, C97T, C97U, CK38, CU31, CU75, CU95, CW10, CZ99, MIC6

Manufacturer

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Emergency Information

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Website

For a current 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.

OSHA regulatory status

This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Potential health effects

The health effects listed below are not likely to occur unless processing of this product generates dusts or fumes.

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. Contact with residual oil/oil coating: Can cause irritation. Prolonged or repeated skin contact may cause dermatitis.
Inhalation	Health effects from mechanical processing (e.g., cutting, grinding): Dust: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis), damage to the heart muscle (cardiomyopathy), reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes), central nervous system damage, secondary Parkinson's disease and reproductive harm. Contains (Cobalt, Nickel). May produce an allergic reaction. Additional health effects from elevated temperature processing (e.g., welding, melting): Dust and fumes: Can cause irritation of the respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, chills, fever, shortness of breath and malaise), reduced ability of the blood to carry oxygen (methemoglobin) and the accumulation of fluid in the lungs (pulmonary edema). Chronic overexposures: Can cause asthma, benign lung disease (siderosis) and lung cancer.
Ingestion	Not relevant, due to the form of the product.
Carcinogenicity and Reproductive Hazard	Product as shipped: Does not present any cancer or reproductive hazards. Dust from mechanical processing: Can present a cancer hazard (Cobalt, Nickel, Lead). Can present a reproductive hazard (Lead, Manganese). Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (Cobalt compounds, Hexavalent chromium compounds, Nickel compounds, Lead compounds, Welding fumes). Can present a reproductive hazard (Manganese compounds, Lead compounds).
Medical conditions aggravated by exposure to product	Dust and fumes from processing: Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.
Potential environmental effects	Not expected to be harmful to aquatic organisms.

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	>84
Zinc	7440-66-6	<12
Copper	7440-50-8	<4.7
Magnesium	7439-95-4	<3.7
Cobalt†	7440-48-4	<2.0
Manganese	7439-96-5	<1.5
Iron	7439-89-6	<1.4
Silicon	7440-21-3	<1.2
Chromium	7440-47-3	<0.4
Nickel††	7440-02-0	0 - 0.2
Lead‡	7439-92-1	<0.05

Additional Information † - Alloys: 7064 and 7090.
†† - Alloys: 7093 and C7093.
‡ - Present as impurity. While Lead is not intentionally added to this mixture, it could potentially enter through the recycle stream.

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 fume from processing or contact with lubricant/residual oil: 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. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

Ingestion	Not relevant, due to the form of the product.
Most important symptoms and effects, both acute and delayed	Dust and fumes from processing: Contains (Cobalt, Nickel). May produce an allergic reaction. May cause sensitization of susceptible persons by skin contact or by inhalation of dust. Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.
Notes to physician	Contact with residual oil/oil coating: Chronic exposure may cause dermatitis.
General advice	Symptoms may be delayed. In case of shortness of breath, give oxygen. IF exposed or concerned: Get medical advice/attention. In case of shortness of breath, give oxygen.

5. Fire Fighting Measures

General fire hazards	This product does not present fire or explosion hazards as shipped. Small chips, fine turnings, and dust from processing may be readily ignitable.
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	
Specific hazards arising from the chemical	Explosion/fire hazards may be present when: <ul style="list-style-type: none"> • 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. Thermite reactions can also occur with oxides of lead, copper, iron, bismuth and certain other metals.
Protective equipment and precautions for firefighters	Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.
Hazardous combustion products	No hazardous decomposition products are known.
Fire fighting equipment/instructions	Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. If possible, isolate the burning material to prevent fire spread, and allow the material to burn itself out.
Explosion data	
Sensitivity to mechanical impact	Not applicable.
Sensitivity to static discharge	Take precautionary measures against static discharges when there is a risk of dust explosion.

6. Accidental Release Measures

Personal precautions	Avoid generating dust. Avoid contact with sharp edges or heated metal. Molten, heated and cold aluminum look alike; do not touch unless you know it is cold. Avoid inhalation of fumes from molten product. Use personal protection recommended in Section 8 of the SDS.
Environmental precautions	Collect spillage. Reuse or recycle material whenever possible.
Evacuation procedures	Keep unnecessary personnel away.
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. Use personal protection recommended in Section 8 of the SDS.

Storage

Store in a dry place.

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) Standards 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.

Dross Handling

Small amounts of beryllium (<0.0002% or <2 ppm) can be present in aluminum alloys either from naturally occurring beryllium in aluminum ore or as a alloying element in the aluminum recycling stream. This beryllium does not present a health hazard during processing (grinding, cutting or welding) of aluminum products. However, beryllium may concentrate in the dross formed when aluminum scrap is remelted. Therefore, the potential for exposures to beryllium when handling dross must be considered. Control of airborne dust levels would be critical in reducing or eliminating this potential. For more information on the hazards associated with handling dross that contains beryllium, refer to Alcoa MSDS No. 1013, Aluminum Dross with Low Beryllium. Copies of this MSDS are available on www.alcoa.com or by calling +412-553-4649.

8. Exposure Controls / Personal Protection

Engineering controls	Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.
Personal protective equipment	
Eye / face protection	Wear safety glasses with side shields. Wear a face shield when working with molten material.
Skin and body protection	Molten metal: Contact with molten material can cause thermal burns. Flame retardant protective clothing is recommended. Full Face Shield.
Hand protection	Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury. When material is heated, wear gloves to protect against thermal burns.
Thermal hazards	Contact with molten material can cause thermal burns. Hot aluminum does not necessarily glow red. Flame retardant protective clothing is recommended. When material is heated, wear gloves to protect against thermal burns.
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: P95, P100 for Lead.
Environmental exposure controls	No special environmental precautions required.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke. Wash hands before breaks and at the end of workday.
Recommended monitoring procedures	Follow standard monitoring procedures.

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).

Minimize breathing oil vapors and mist. Remove oil contaminated clothing; launder or dry-clean before reuse. Remove oil contaminated shoes and thoroughly clean and dry before reuse. Cleanse skin thoroughly after contact, before breaks and meals, and at the end of the work period. Oil coating is readily removed from skin with waterless hand cleaners followed by a thorough washing with soap and water.

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m ³ 15 mg/m ³	Respirable dust (Total dust)
Chromium (CAS 7440-47-3)	TWA	1 mg/m ³	
Copper (CAS 7440-50-8)	TWA	1 mg/m ³ 0.1 mg/m ³	Dust and mist. Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m ³	Fume
Nickel†† (CAS 7440-02-0)	TWA	1 mg/m ³	
Silicon (CAS 7440-21-3)	TWA	5 mg/m ³ 15 mg/m ³	Respirable fraction. (total dust)
Additional components	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m ³ 15 mg/m ³	Respirable fraction. Total dust.
Chromium (II) compounds (CAS No. Not available)	TWA	0.5 mg/m ³	
Chromium (III) compounds (CAS No. Not available)	TWA	0.5 mg/m ³	(as Cr)
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	TWA	0.0025 mg/m ³	Action Level (as Cr)
Chromium (VI) compounds (CAS No. Not available)	TWA	0.005 mg/m ³	(as Cr)
Iron oxide (CAS 1309-37-1)	TWA	0.0025 mg/m ³ 10 mg/m ³	Action (as Cr) Fume.

U.S. - OSHA

Additional components	Type	Value	Form
Lead compounds, inorganic (CAS No. Not available)	TWA	0.05 mg/m3	(as Pb)
Manganese compounds, inorganic (CAS No. Not available)	Ceiling	0.03 mg/m3 5 mg/m3	Action Level (as Pb) (as Mn) Fume
Nickel compounds, insoluble (CAS No. Not available)	TWA	1 mg/m3	
Nitric oxide (CAS 10102-43-9)	TWA	30 mg/m3	
Oil mist, mineral (CAS 8012-95-1)	TWA	25 ppm 5 mg/m3	Mist.
Ozone (CAS 10028-15-6)	TWA	0.2 mg/m3 0.1 ppm	
Zinc oxide (CAS 1314-13-2)	TWA	5 mg/m3 5 mg/m3 15 mg/m3	Respirable fraction. Fume. Total dust.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value	Form
Lead‡ (CAS 7439-92-1)	TWA	0.05 mg/m3	
Additional components	Type	Value	Form
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	TWA	0.005 mg/m3	
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	TWA	0.005 mg/m3 0.005 mg/m3	(as Cr)

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Cobalt† (CAS 7440-48-4)	PEL	0.1 mg/m3	Dust and fume.
Additional components	Type	Value	Form
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	PEL	1 mg/m3	
Magnesium oxide fume (CAS 1309-48-4)	PEL	15 mg/m3	Total particulate.
Nitrogen dioxide (CAS 10102-44-0)	Ceiling	9 mg/m3	
Oil mist, mineral (CAS 8012-95-1)	PEL	5 ppm 5 mg/m3	Mist.
Alcoa Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	3 mg/m3 10 mg/m3	Respirable fraction Total dust
Cobalt† (CAS 7440-48-4)	TWA	0.02 mg/m3	Inhalable fraction
Manganese (CAS 7439-96-5)	TWA	0.05 mg/m3	Total dust.
Nickel†† (CAS 7440-02-0)	TWA	0.02 mg/m3 1 mg/m3	Respirable fraction.
Additional components	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	3 mg/m3	Respirable fraction.
Chromium (VI) compounds (CAS No. Not available)	TWA	10 mg/m3 0.25 µg/m3	Total dust.

Alcoa

Additional components	Type	Value	Form
Manganese compounds, inorganic (CAS No. Not available)	TWA	0.05 mg/m3	Total dust, as Mn.
		0.02 mg/m3	Respirable fraction, as Mn.
Nickel compounds, insoluble (CAS No. Not available)	TWA	0.1 mg/m3	Insoluble
Oil mist, mineral (CAS 8012-95-1)	TWA	0.5 mg/m3	(8 Hour)

ACGIH

Additional components	Type	Value	Form
Aluminum oxide (non-fibro us) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction, as Al
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	TWA	0.01 mg/m3	as Cr
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	TWA	0.05 mg/m3	as Cr
Ozone (CAS 10028-15-6)	TWA	0.2 ppm	(Heavy, moderate or light workloads (≤2 hours))
		0.1 ppm	(light work)
		0.08 ppm	(moderate work)
		0.05 ppm	heavy work
		0.05 ppm	(heavy work)

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	
Cobalt† (CAS 7440-48-4)	TWA	0.02 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Lead‡ (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Nickel†† (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Additional components	Type	Value	Form
Chromium (III) compounds (CAS No. Not available)	TWA	0.5 mg/m3	
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	TWA	0.01 mg/m3	
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	TWA	0.05 mg/m3	
Chromium (VI) compounds (CAS No. Not available)	TWA	0.01 mg/m3	
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Lead compounds, inorganic (CAS No. Not available)	TWA	0.05 mg/m3	(as Pb)
Magnesium oxide fume (CAS 1309-48-4)	TWA	10 mg/m3	Inhalable fraction.
Manganese compounds, inorganic (CAS No. Not available)	TWA	0.2 mg/m3	
Nickel compounds, insoluble (CAS No. Not available)	TWA	0.2 mg/m3	Inhalable fraction.
Nitric oxide (CAS 10102-43-9)	TWA	25 ppm	

US. ACGIH Threshold Limit Values

Additional components	Type	Value	Form
Nitrogen dioxide (CAS 10102-44-0)	TWA	0.2 ppm	
Oil mist, mineral (CAS 8012-95-1)	TWA	5 mg/m3	Inhalable fraction.
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

9. Physical & Chemical Properties

Form	Solid.
Color	Silver colored.
Odor	Odorless
pH	Not applicable
Auto-ignition temperature	Not applicable
Boiling point	Not determined
Density	2.72 - 2.90 g/cm3
Evaporation rate	Not applicable
Flash point	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Flammability limits in air, lower, % by volume	Not applicable
Melting point/Freezing point	890 - 1215 °F (476.7 - 657.2 °C)
Odor threshold	Not applicable
Partition coefficient (n-octanol/water)	Not applicable. Not applicable
Other data	
Decomposition temperature	Not applicable
Explosivity	Not applicable
Oxidising properties	Not applicable.
Solubility (water)	Insoluble
Specific gravity	Not determined
Relative density	Not determined
Vapor density	Not applicable
Vapor pressure	Not applicable
Viscosity	Not applicable

10. Chemical Stability & Reactivity Information

Chemical 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:

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

Explosions can occur with coils of foil that have been submerged or partially submerged in water for an extended period of time. Water can penetrate between the layers of foil, react with the aluminum surface and generate heat and hydrogen gas. When the coils are removed from the cooling effects of the water, rapid temperature increases can occur causing steam explosions which result in the rupture of the coils and discharge of debris.

Coils of foil may be a potential hazard under the following conditions:

- Coil has been annealed (annealing removes residual oil that could prevent penetration of water)
- Foil is very thin gauge (5-9 μm thickness which increases surface area)
- Coil has been immersed for an extended period of time (several hours or more)
- Wetted coil has recently been removed from the cooling effects of the water

In such situations, the coils should be isolated (30 meters from any personnel) for at least 72 hours as soon as possible after removal from the water. Coils making crackling sounds or emitting steam should not be approached or transported in commerce. Wetted coils should not be charged into a furnace for remelting until completely dry.

Possibility of hazardous reactions

Hazardous polymerization does not occur.

Incompatible materials

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

- 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).

Thermite reactions can occur with oxides of lead, copper, iron, bismuth and certain other metals. 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.

Hazardous decomposition products

No hazardous decomposition products are known.

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.

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.

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

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.

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).

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). IARC/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, 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).

Some products are supplied with an oil coating or have residual oil from the manufacturing process. Oil: Can cause irritation of skin. Skin contact (prolonged or repeated): Can cause dermatitis.

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.

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).

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).

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).

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

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).

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.

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).

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).

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).

If the product is heated well above ambient temperatures or machined, oil vapor or mist may be generated.

Oil vapor or mist: Can cause irritation of respiratory tract. Acute overexposures: Can cause bronchitis, headache, central nervous system effects (nausea, dizziness and loss of coordination) and drowsiness (narcosis).

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 (methemoglobin). 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).

Components	Test Results
Nickel†† (7440-02-0)	Acute Oral LD50 Rat: > 9000 mg/kg
Cobalt† (7440-48-4)	Acute Other LD100 Mouse: 150 mg/kg Acute Other LD100 Rabbit: 20 mg/kg Acute Other LD100 Rat: 100 mg/kg
Additional components	Test Results
Iron oxide (1309-37-1)	Acute Oral LD50 Rat: > 10000 mg/kg
Zinc oxide (1314-13-2)	Acute Oral LD50 Rat: > 5000 mg/kg
Aluminum oxide (non-fibrous) (1344-28-1)	Acute Oral LD50 Rat: > 5000 mg/kg
Routes of exposure	Inhalation. Skin contact. Eye contact.
Acute effects	Not classified. Based on available data, the classification criteria are not met. Dust and fumes from processing: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Chronic effects	Dust and fumes from processing: Chronic overexposures: Component in this formulation may cause respiratory and skin sensitization. Repeated inhalation may be harmful; lung irritation and serious central nervous system disorders may result.
Skin corrosion/irritation	Non-corrosive.
Serious eye damage/irritation	Dust and fume from processing: Can cause mechanical irritation.
Respiratory sensitizer	Product as shipped: Not classified. Dust and fumes from processing: Contains (Cobalt, Nickel). May produce an allergic reaction. May cause sensitization by inhalation.
Sensitization	Product as shipped: Not a skin sensitizer. Dust and fume from processing: Contains (Cobalt, Nickel). May produce an allergic reaction. May cause sensitization by skin contact.

Carcinogenicity

Product as shipped: Does not present any cancer hazards.

Health effects from mechanical processing (e.g., cutting, grinding): Can present a cancer hazard (Cobalt, Nickel, Lead).

Health effects from elevated temperature processing (e.g., welding, melting): Can present a cancer hazard (Hexavalent chromium compounds, Nickel compounds, Lead compounds, Welding fumes).

ACGIH Carcinogens

Aluminum (CAS 7429-90-5)	A4 Not classifiable as a human carcinogen.
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	A4 Not classifiable as a human carcinogen.
Chromium (CAS 7440-47-3)	A4 Not classifiable as a human carcinogen.
Chromium (III) compounds (CAS No. Not available)	A4 Not classifiable as a human carcinogen.
Chromium (VI) compounds (CAS No. Not available)	A1 Confirmed human carcinogen.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	A1 Confirmed human carcinogen.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	A1 Confirmed human carcinogen.
Cobalt† (CAS 7440-48-4)	A3 Confirmed animal carcinogen with unknown relevance to humans.
Iron oxide (CAS 1309-37-1)	A4 Not classifiable as a human carcinogen.
Lead compounds, inorganic (CAS No. Not available)	A3 Confirmed animal carcinogen with unknown relevance to humans.
Lead‡ (CAS 7439-92-1)	A3 Confirmed animal carcinogen with unknown relevance to humans.
Magnesium oxide fume (CAS 1309-48-4)	A4 Not classifiable as a human carcinogen.
Nickel compounds, insoluble (CAS No. Not available)	A1 Confirmed human carcinogen.
Nickel†† (CAS 7440-02-0)	A5 Not suspected as a human carcinogen.
Nitrogen dioxide (CAS 10102-44-0)	A4 Not classifiable as a human carcinogen.
Oil mist, mineral (CAS 8012-95-1)	A2 Suspected human carcinogen.
Ozone (CAS 10028-15-6)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Chromium (CAS 7440-47-3)	3 Not classifiable as to carcinogenicity to humans.
Chromium (III) compounds (CAS No. Not available)	3 Not classifiable as to carcinogenicity to humans.
Chromium (VI) compounds (CAS No. Not available)	1 Carcinogenic to humans.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	1 Carcinogenic to humans.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	1 Carcinogenic to humans.
Iron oxide (CAS 1309-37-1)	3 Not classifiable as to carcinogenicity to humans.
Lead compounds, inorganic (CAS No. Not available)	2A Probably carcinogenic to humans.
Lead‡ (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel compounds, insoluble (CAS No. Not available)	1 Carcinogenic to humans.
Nickel†† (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Silica, amorphous (CAS 69012-64-2)	3 Not classifiable as to carcinogenicity to humans.

US NTP Report on Carcinogens: Anticipated carcinogen

Lead compounds, inorganic (CAS No. Not available)	Reasonably Anticipated to be a Human Carcinogen.
Lead‡ (CAS 7439-92-1)	Reasonably Anticipated to be a Human Carcinogen.
Nickel†† (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.

US NTP Report on Carcinogens: Known carcinogen

Chromium (VI) compounds (CAS No. Not available)	Known To Be Human Carcinogen.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Known To Be Human Carcinogen.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Known To Be Human Carcinogen.
Nickel†† (CAS 7440-02-0)	Known To Be Human Carcinogen.
Oil mist, mineral (CAS 8012-95-1)	Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Chromium (VI) compounds (CAS No. Not available)	Cancer hazard.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Cancer hazard.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Cancer hazard.

Teratogenicity

Not classified. Based on available data, the classification criteria are not met.

Reproductive toxicity	Classification not possible. Due to lack of data the classification is not possible. Product as shipped: Does not present any reproductive hazards.
	Dust or fume from processing: Can present a reproductive hazard (Lead, Manganese, Manganese compounds and Lead compounds).
Germ cell mutagenicity	Classification not possible. Due to lack of data the classification is not possible.
Interactive effects	Not available.
Specific target organ toxicity - single exposure	Dust and fumes from processing: Classification not possible. Due to lack of data the classification is not possible.
Specific target organ toxicity - repeated exposure	Classification not possible. Due to lack of data the classification is not possible. May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	Not applicable.
Symptoms	Dust and fume from processing: Contains (Cobalt, Nickel). May produce an allergic reaction. May cause sensitization of susceptible persons by skin contact or by inhalation of dust. 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). IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B). Chronic exposure to breathing low levels of manganese dust or fume over a long period of time can result in "manganism," a disease of the central nervous system similar to Parkinson's Disease, gait impairment, muscle spasms and behavioral changes. Contains nickel, which can cause lung or nasal cancer. Long-term breathing of this material may cause chronic lung disease. Lead may damage kidney function, the blood forming system and the reproductive system. Contact with residual oil/oil coating: Prolonged skin contact may cause skin irritation and/or dermatitis.
Further information	None known.

12. Ecological Information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Components	Species	Test Results
Aluminum (CAS 7429-90-5)		
Aquatic		
Crustacea	LC50	Water flea (Daphnia magna)
Fish	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		0.16 mg/l, 96 hours
		0.12 mg/l, 96 hours
Iron (CAS 7439-89-6)		
Aquatic		
Crustacea	LC50	Cockle (Cerastoderma edule)
		Common shrimp, sand shrimp (Crangon crangon)
Fish	LC50	Channel catfish (Ictalurus punctatus)
		> 500 mg/l, 96 hours
Additional components	Species	Test Results
Aluminum oxide (non-fibrous) (CAS 1344-28-1)		

Persistence and degradability	The product is not expected to be biodegradable.
Bioaccumulative potential	The product is not bioaccumulating.
Mobility in soil	Not considered mobile.
Mobility in general	Not applicable.
Other adverse effects	None known.

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.
Waste from residues / unused products	Not applicable.
Contaminated packaging	Not applicable.

14. Transport Information

General Shipping Information

Basic shipping requirements:

UN number	-
Proper shipping name	Not regulated
Hazard class	-
Packing group	-

General Shipping Notes

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

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards & special precautions. Otherwise, it is presumed that the information is not available/not relevant.

15. Regulatory Information

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 Existing Commercial Chemical Substances (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	Yes
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.

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.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

Nitric oxide (CAS 10102-43-9)	10 LBS
Nitrogen dioxide (CAS 10102-44-0)	10 LBS
Ozone (CAS 10028-15-6)	100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

Nitric oxide (CAS 10102-43-9)	100 LBS
Nitrogen dioxide (CAS 10102-44-0)	100 LBS

Ozone (CAS 10028-15-6) 100 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Aluminum (CAS 7429-90-5)	1.0 %
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	1.0 %
Chromium (CAS 7440-47-3)	1.0 %
Chromium (II) compounds (CAS No. Not available)	1.0 % N090
Chromium (III) compounds (CAS No. Not available)	1.0 % N090
Chromium (VI) compounds (CAS No. Not available)	0.1 % N090
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	0.1 % N090
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	0.1 % N090
Cobalt† (CAS 7440-48-4)	0.1 %
Copper (CAS 7440-50-8)	1.0 %
Lead compounds, inorganic (CAS No. Not available)	0.1 % N420 Substance is not eligible for the de minimis exemption except for the purposes of supplier notification requirements.
Lead‡ (CAS 7439-92-1)	0.1 % Substance is not eligible for the de minimis exemption except for the purposes of supplier notification requirements.
Manganese (CAS 7439-96-5)	1.0 %
Manganese compounds, inorganic (CAS No. Not available)	1.0 % N450
Nickel compounds, insoluble (CAS No. Not available)	0.1 % N495
Nickel†† (CAS 7440-02-0)	0.1 %
Ozone (CAS 10028-15-6)	1.0 %
Zinc (CAS 7440-66-6)	1.0 %
Zinc oxide (CAS 1314-13-2)	1.0 % N982

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Reportable threshold

Lead compounds, inorganic (CAS No. Not available)	100 LBS N420
Lead‡ (CAS 7439-92-1)	100 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Aluminum (CAS 7429-90-5)	Listed.
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	Listed.
Chromium (CAS 7440-47-3)	Listed.
Chromium (III) compounds (CAS No. Not available)	Listed. N090
Chromium (VI) compounds (CAS No. Not available)	Listed. N090
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed. N090
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed. N090
Cobalt† (CAS 7440-48-4)	Listed.
Copper (CAS 7440-50-8)	Listed.
Lead compounds, inorganic (CAS No. Not available)	Listed. N420
Lead‡ (CAS 7439-92-1)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Manganese compounds, inorganic (CAS No. Not available)	Listed. N450
Nickel compounds, insoluble (CAS No. Not available)	Listed. N495
Nickel†† (CAS 7440-02-0)	Listed.
Ozone (CAS 10028-15-6)	Listed.
Zinc (CAS 7440-66-6)	Listed.
Zinc oxide (CAS 1314-13-2)	Listed. N982

State regulations

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Chromium (VI) compounds (CAS No. Not available)	Listed: February 27, 1987 Carcinogenic.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed: February 27, 1987 Carcinogenic.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed: February 27, 1987 Carcinogenic.
Cobalt† (CAS 7440-48-4)	Listed: July 1, 1992 Carcinogenic.
Lead compounds, inorganic (CAS No. Not available)	Listed: October 1, 1992 Carcinogenic.
Lead‡ (CAS 7439-92-1)	Listed: October 1, 1992 Carcinogenic.
Nickel compounds, insoluble (CAS No. Not available)	Listed: May 7, 2004 Carcinogenic.
Nickel†† (CAS 7440-02-0)	Listed: October 1, 1989 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Chromium (VI) compounds (CAS No. Not available)	Listed: December 19, 2008 Developmental toxin.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed: December 19, 2008 Developmental toxin.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed: December 19, 2008 Developmental toxin.
Lead compounds, inorganic (CAS No. Not available)	Listed: February 27, 1987 Developmental toxin.
Lead‡ (CAS 7439-92-1)	Listed: February 27, 1987 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Chromium (VI) compounds (CAS No. Not available)	Listed: December 19, 2008 Female reproductive toxin.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed: December 19, 2008 Female reproductive toxin.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed: December 19, 2008 Female reproductive toxin.
Lead compounds, inorganic (CAS No. Not available)	Listed: February 27, 1987 Female reproductive toxin.
Lead‡ (CAS 7439-92-1)	Listed: February 27, 1987 Female reproductive toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Chromium (VI) compounds (CAS No. Not available)	Listed: December 19, 2008 Male reproductive toxin.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed: December 19, 2008 Male reproductive toxin.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed: December 19, 2008 Male reproductive toxin.
Lead compounds, inorganic (CAS No. Not available)	Listed: February 27, 1987 Male reproductive toxin.
Lead‡ (CAS 7439-92-1)	Listed: February 27, 1987 Male reproductive toxin.

US - New Jersey RTK - Substances: Listed substance

Aluminum (CAS 7429-90-5)	Listed.
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	Listed.
Chromium (CAS 7440-47-3)	Listed.
Chromium (II) compounds (CAS No. Not available)	Listed.
Chromium (VI) compounds (CAS No. Not available)	Listed.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed.
Cobalt† (CAS 7440-48-4)	Listed.
Copper (CAS 7440-50-8)	Listed.
Iron oxide (CAS 1309-37-1)	Listed.
Lead compounds, inorganic (CAS No. Not available)	Listed.
Lead‡ (CAS 7439-92-1)	Listed.
Magnesium (CAS 7439-95-4)	Listed.
Magnesium oxide fume (CAS 1309-48-4)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Manganese compounds, inorganic (CAS No. Not available)	Listed.
Nickel compounds, insoluble (CAS No. Not available)	Listed.
Nickel†† (CAS 7440-02-0)	Listed.
Nitric oxide (CAS 10102-43-9)	Listed.
Nitrogen dioxide (CAS 10102-44-0)	Listed.
Oil mist, mineral (CAS 8012-95-1)	Listed.
Ozone (CAS 10028-15-6)	Listed.
Silica, amorphous (CAS 69012-64-2)	Listed.
Silicon (CAS 7440-21-3)	Listed.
Zinc (CAS 7440-66-6)	Listed.
Zinc oxide (CAS 1314-13-2)	Listed.

US - Pennsylvania RTK - Hazardous Substances: All compounds of this substance are considered environmental hazards

Chromium (CAS 7440-47-3)	LISTED
Cobalt† (CAS 7440-48-4)	LISTED
Copper (CAS 7440-50-8)	LISTED
Lead‡ (CAS 7439-92-1)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel†† (CAS 7440-02-0)	LISTED
Zinc (CAS 7440-66-6)	LISTED

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Chromium (CAS 7440-47-3)	Special hazard.
Chromium (VI) compounds (CAS No. Not available)	Special hazard.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Special hazard.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Special hazard.
Nickel†† (CAS 7440-02-0)	Special hazard.

US. Pennsylvania RTK - Hazardous Substances

Aluminum (CAS 7429-90-5)	Listed.
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	Listed.
Chromium (CAS 7440-47-3)	Listed.
Chromium (VI) compounds, certain water insoluble forms (CAS No. Not available)	Listed.
Chromium (VI) compounds, water soluble forms (CAS No. Not available)	Listed.
Cobalt† (CAS 7440-48-4)	Listed.
Copper (CAS 7440-50-8)	Listed.
Iron oxide (CAS 1309-37-1)	Listed.
Lead‡ (CAS 7439-92-1)	Listed.
Magnesium (CAS 7439-95-4)	Listed.
Magnesium oxide fume (CAS 1309-48-4)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Nickel†† (CAS 7440-02-0)	Listed.
Nitric oxide (CAS 10102-43-9)	Listed.
Nitrogen dioxide (CAS 10102-44-0)	Listed.
Oil mist, mineral (CAS 8012-95-1)	Listed.
Ozone (CAS 10028-15-6)	Listed.
Silica, amorphous (CAS 69012-64-2)	Listed.
Silicon (CAS 7440-21-3)	Listed.
Zinc (CAS 7440-66-6)	Listed.
Zinc oxide (CAS 1314-13-2)	Listed.

CERCLA (Superfund) reportable quantity

Zinc: 1000
 Copper: 5000
 Chromium: 5000
 Nickel††: 100
 Lead‡: 10

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
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No

16. Other Information

Recommended use	Fabricated aluminum parts and products
Recommended restrictions	None known.
Further information	Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.
Disclaimer	The information in the sheet was written based on the best knowledge and experience currently available.
This data sheet contains changes from the previous version in section(s):	This document has undergone significant changes and should be reviewed in its entirety.

MSDS Status

June 4, 2013: Change(s) in Section: 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15 and 16.
January 14, 2010: New format.
February 21, 2007: Change(s) in Section: 1, 2, 7 and 8.
October 26, 2006: Reviewed on a periodic basis in accordance with Alcoa policy. Change(s) in Section: 1, 2, 3, 4, 5, 7, 8, 10, 11, 12 and 15.
August 20, 2003: Change(s) in Section: 1, 2, 3, 8 and 15.

Preparer: Jim Perriello, +1-865-977-2051

SDS System Number: 115824

Other information

- Guide to Occupational Exposure Values 2012, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, September 2005.
- expub, Expert Publishing, LLC., www.expub.com,
- Ariel, 3E Company, www.3Ecompany.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 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
- NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
- NFPA 77, Standard for Static Electricity
- NFPA 68, Standard on Explosion Protection by Deflagration Venting
- NFPA 69, Standard on Explosion Prevention Systems

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 SDS ***

WROUGHT ALUMINUM PRODUCTS, 7xxx SERIES ALLOYS

EMERGENCY OVERVIEW:

WARNING

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.

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

Chronic overexposures: Can cause scarring of the lungs, damage to the heart muscle, reduction in the number of red blood cells, skin abnormalities, 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, reduced ability of the blood to carry oxygen and the accumulation of fluid in the lungs. Chronic overexposures: Can cause asthma, benign lung disease and lung cancer.

FIRST AID:

EYES: Dust and fumes from processing: Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

SKIN: Dust and fume from processing or contact with lubricant/residual oil: 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. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

INGESTION: Not relevant, due to the form of the product.

IN CASE OF FIRE: Use Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and turnings.

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.

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. Use personal protection recommended in Section 8 of the SDS.

STORAGE:

Store in a dry place.

IN CASE OF SPILL:

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.

See SDS 0669.



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