

# Material Safety Data Sheet

Material Name: WROUGHT ALUMINUM PRODUCTS, 1xxx SERIES ALLOYS

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

**Chemical Formula:** Mixture

**Product Use:** Various fabricated aluminum parts and products.

**Other Designations:** 1xxx Series Alloys, 1xxx Cladding, 1350BS, 1435, 990LR, 995LR, C01A, C49A, C65A, C99A,

C01B, C18B, C19B, C27B, C178, C479, C481, C531, C794, C798, CZ60, Clad 1100, KB10, MD56, MD115, MD119, MD230,

MD251, MD335, RA91, RA179, W006.

Alcoa Inc. Phone: Health and Safety: 1-412-553-4649

201 Isabella Street

Pittsburgh, PA 15212-5858

### **Emergency Information:**

USA: Chemtrec: 1-800-424-9300 or 1-703-527-3887

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

### **CAS # Component Percent**

7429-90-5 Aluminum >99.3

### **Component Information**

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

## \*\*\* Section 3 - Hazards Identification \*\*\*

### **Emergency Overview**

Solid. Silvery. Odorless. Non-flammable 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 the air.

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

= Dust or fines are in contact with certain metal oxides (e.g. rust).

= Molten metal is in contact with water/moisture or certain metal oxides.

Dust and fume from processing can cause irritation of eyes, skin and upper respiratory tract.

### **Potential Health Effects**

**(If dusts or fumes are generated by processing)**

#### **Eyes**

Can cause irritation.

#### **Skin**

Can cause irritation.

#### **Inhalation**

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

## Health Effects of Ingredients

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

**Aluminum dust, fines and fumes** Low health risk by inhalation. ACGIH: Listed as nuisance dust (milling, cutting, grinding).

Some products are supplied with a lubricant/oil coating or have residual oil from the manufacturing process. **Oil** Can cause irritation of skin. Skin contact (prolonged or repeated): Can cause dermatitis. **Mineral oils, untreated or mildly refined** Studies with experimental animals by skin contact have found skin tumors. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)\*.

## Health Effects Of Additional Compounds Which May Be Formed During Processing

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

**Alumina** Low health risk by inhalation. ACGIH: Listed as nuisance dust.

If the product is heated well above ambient temperatures or machined, oil vapor or mist may be generated. **Oil vapor and mist** Can cause irritation of respiratory tract. Acute overexposures: Can cause bronchitis, asthma, 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 fluid in the lungs (pulmonary edema). Effects can be delayed up to 1-2 hours. Additional information: Studies with experimental animals by inhalation have found genetic damage, reproductive harm, blood cell damage, lung damage and death.

**Welding fumes** IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)\*. Additional Information: In one study, occupational asthma was associated with exposures to fumes from aluminum welding. Plasma arc cutting can generate oxides of nitrogen. **Oxides of nitrogen (NO and NO<sub>2</sub>)** 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, fluid in the lungs (pulmonary edema) and death.

Effects

may be delayed up to 2-3 weeks. **Nitrogen dioxide (NO<sub>2</sub>)** Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis).

## \*IARC Classifications

Group 1: The agent is carcinogenic to humans. There is sufficient evidence that a causal relationship existed between exposure to the agent and human cancer.

Group 2B: The agent is possibly carcinogenic to humans. Generally includes agents for which there is limited evidence in the absence of sufficient evidence in experimental animals.

## Medical Conditions Aggravated By Exposure to the Product

Asthma, chronic lung disease, and skin rashes.

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

**First Aid: Eyes**

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

**First Aid: Skin**

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

**First Aid: Inhalation**

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

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

**Flammable Properties**

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

**Fire/Explosion**

May be a potential hazard under the following conditions:

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

= Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas could

present an explosion hazard in confined or poorly ventilated spaces.

= Fines and dust in contact with certain metal oxides (e.g., rust). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.

= Molten metal in contact with water/moisture or other metal oxides (e.g., rust). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction.

**Extinguishing Media**

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

DO NOT USE: Halogenated agents on small chips, dusts or fines. Water around molten metal.

**Fire Fighting Equipment/Instructions**

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

clothing when appropriate.

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

**Small/Large Spill**

*If molten:* Contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of

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

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

**Handling/Storage**

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

**Requirements for Processes Which Generate Dusts or Fumes**

If processing of these products includes operations where dust or extremely fine particulate is generated, obtain

and

follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire

Protection Association (NFPA) brochures listed in Section 16. Cover and reseal partially empty containers. Use nonsparking

handling equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during dust handling and transfer operations. (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic

precipitators must not be used. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

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

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

### **Requirements for Remelting of Scrap Material and/or Ingot**

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal

to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are

known to have caused explosions in melting operations. While the products may have minimal surface roughness

and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

All tooling and containers which come in contact with molten metal must be preheated or specially coated and rust

free. Molds and ladles must be preheated or oiled prior to casting. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated.

Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate

enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the

particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

= Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.

= Store materials in dry, heated areas with any cracks or cavities pointed downwards.

= Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten

metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

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

## **Engineering Controls**

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

## **Personal Protective Equipment**

### **Respiratory Protection**

Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if

concentrations exceed the limits listed in Section 8. Suggested respiratory protection: P95

### **Eye Protection**

Wear safety glasses/goggles to avoid eye contact.

### **Skin Protection**

Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury.

### **General**

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

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.

## **Exposure Guidelines**

### **A: General Product Information**

Alcoa recommends an Occupational Exposure Limit for Oil Mist of 0.5 mg/m<sup>3</sup> TWA.

### **B: Component Exposure Limits**

#### **Aluminum (7429-90-5)**

ACGIH 10 mg/m<sup>3</sup> TWA (metal dust)

OSHA 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

#### **Chromium (7440-47-3)**

ACGIH 0.5 mg/m<sup>3</sup> TWA

OSHA 1 mg/m<sup>3</sup> TWA

### **C: Additional Compounds Which May be Formed During Processing**

#### **Alumina (non-fibrous) (1344-28-1)**

ACGIH as Al: 10 mg/m<sup>3</sup> TWA (The value is for total dust containing no asbestos and < 1% crystalline silica)

OSHA 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

#### **Chromium (II) compounds (Not Available)**

OSHA 0.5 mg/m<sup>3</sup> TWA (as Cr)

#### **Chromium (III) compounds (as Cr) (Not Available)**

ACGIH as Cr: 0.5 mg/m<sup>3</sup> TWA

**Chromium (VI) compounds- water soluble (Not Available)**

ACGIH 0.05 mg/m<sup>3</sup> TWA

**Chromium (VI) compounds (certain water insoluble forms) (Not Available)**

ACGIH 0.01 mg/m<sup>3</sup> TWA

**Chromic acid and chromates (7738-94-5)**

OSHA and chromates: C 1 mg/10m<sup>3</sup>

**Welding fumes (NOC) (Not Available)**

ACGIH 5 mg/m<sup>3</sup> TWA

**Ozone (10028-15-6)**

ACGIH Heavy work: 0.05 ppm TWA; Moderate work: 0.08 ppm TWA; Light work: 0.1 ppm TWA;  
heavy, moderate or light work, <= 2Hrs: 0.20 ppm

OSHA 0.1 ppm TWA; 0.2 mg/m<sup>3</sup> TWA

**Nitrogen dioxide (10102-44-0)**

ACGIH 3 ppm TWA

ACGIH 5 ppm STEL

OSHA C 5 ppm; C 9 mg/m<sup>3</sup>

**Nitric oxide (10102-43-9)**

ACGIH 25 ppm TWA

OSHA 25 ppm TWA; 30 mg/m<sup>3</sup> TWA

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

**Physical State:** Solid: sheet, plate, wire, rod,  
bar, extrusion, forgings, etc.

**Appearance:** Silvery

**Boiling Point:** Not applicable **Melting Point:** Range: generally 1190-1215 °F  
(643-657 °C)

**Vapor Pressure:** Not applicable **Vapor Density:** Not applicable

**Solubility Water:** None **Specific Gravity:** See Density

**Density:** Range: generally 2.70-2.71  
g/cm<sup>3</sup> (0.097-0.098 lb/in<sup>3</sup>)

**pH Level:** Not applicable

**Odor:** None **Odor Threshold:** Not applicable

**Octanol-Water Coefficient:** Not applicable

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

**Stability**

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

**Conditions to Avoid**

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

= **Water:** Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased 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) particularly when heated or molten.

= **Acids and alkalis:** Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased

with smaller particles (e.g., fines and dusts).

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

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

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

### **\*\*\* Section 11 - Toxicological Information \*\*\***

#### **Health Effects of Ingredients**

##### **A: General Product Information**

No information available for product.

##### **B: Component Analysis - LD50/LC50**

No LD50/LC50's are available for this product's components.

#### **Carcinogenicity**

##### **A: General Product Information**

No information available for product.

##### **B: Component Carcinogenicity**

##### **Chromium (7440-47-3)**

ACGIH A4 - not classifiable as a human carcinogen

IARC Monograph 49; 1990

### **\*\*\* Section 12 - Ecological Information \*\*\***

#### **Ecotoxicity**

##### **A: General Product Information**

No information available for product.

##### **B: Component Analysis - Ecotoxicity - Aquatic Toxicity**

No ecotoxicity data was found for this product's components.

#### **Environmental Fate**

No information available for product.

### **\*\*\* Section 13 - Disposal Considerations \*\*\***

#### **Disposal Instructions**

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

#### **US EPA Waste Number & Descriptions**

##### **A: General Product Information**

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

##### **B: Component Waste Numbers**

RCRA waste codes other than described under Section A may apply depending on use of product. Refer to 40 CFR

261 or state equivalent in the U.S.

**\*\*\* Section 14 - Transportation Information \*\*\***

**Special Transportation**

**PSN #1 PSN #2 PSN #3 PSN #4**

Notes: (1)

Proper Shipping Name: Not Regulated

Hazard Class: -

UN NA Number: -

Packing Group: -

RQ: -

Other - Tech Name: -

Other - Marine Pollutant: -

**Notes:**

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

Canadian TDG Hazard Class & PIN: Not regulated

**\*\*\* Section 15 - Regulatory Information \*\*\***

**US Federal Regulations**

**A: General Product Information**

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

**B: Component Analysis**

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40

CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

**Aluminum (7429-90-5)**

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

**Chromium (7440-47-3)**

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

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

**SARA 311/312 Physical and Health Hazard Categories:**

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

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

**Fire Hazard:** No

**Sudden Release of Pressure:** No

**Reactive:** Yes, if molten

**State Regulations**

**A: General Product Information**

PENNSYLVANIA "Special Hazardous Substance": Chromium compounds, hexavalent  
Chemical(s) known to the State of California to cause cancer: Hexavalent chromium

**B: Component Analysis - State**

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

**Component CAS # CA FL MA MN NJ PA**

Aluminum 7429-90-5 Yes Yes Yes Yes Yes Yes

Chromium 7440-47-3 Yes Yes Yes Yes Yes Yes

**Other Regulations**

**A: General Product Information**

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

**B: Component Analysis - WHMIS IDL**

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

**Component CAS # Minimum Concentration**

Aluminum 7429-90-5 1% item 47 (197)

**C: Component Analysis - Inventory**

**Component CAS # TSCA DSL EINECS AUST. MITI**

Aluminum 7429-90-5 Yes Yes Yes Yes No

Chromium 7440-47-3 Yes Yes Yes Yes No

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

**\*\*\* Section 16 - Other Information \*\*\***

**MSDS History**

Original: March 16, 1990

Supersedes: March 4, 1999

Revised: August 14, 2000

**MSDS Status**

Changes in Sections 1 and 2.

**Prepared By**

Hazardous Materials Control Committee.

**MSDS System Number**

115949

**Other Information**

= Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 900 19th Street, N.W., Washington, DC 20006.

= Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 900 19th Street,

N.W., Washington, DC 20006.

= NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: 800-344-3555)

= NFPA 651, Standard for Manufacture of Aluminum and Magnesium Powder

= NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)

= NFPA 77, Standard for Static Electricity

= Guide to Occupational Exposure Values-1999, Compiled by the American Conference of Governmental Industrial

Hygienists (ACGIH).

= Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by

the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).

= NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1994.

= 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.

= TOMES CPS(TM), MICROMEDEX, Inc., 1999

## **Material Safety Data Sheet**

**Material Name: WROUGHT ALUMINUM PRODUCTS, 1xxx SERIES ALLOYS**

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