

# Material Safety Data Sheet

Acc. to CHIP3 (UK) or Cont. Products Reg.-SOR/88-66 (Can.)

Printing date 04/04/2007

Reviewed on 04/04/2007

## \* 1 Identification of substance/preparation and company/undertaking:

· **Product details:**

· **Product Name:** REMELT INGOT & CAST ALUMINUM PRODUCTS

686CDN

· **Other Designations:**

Granulated, pebbled, aluminizing, foundry-rich alloy, rotor, remelt scrap ingot (RSI), 5xx.x Series Alloys, A535.1, B535.2, C68K, C69K, C325, C446, C607, C608, RA160, RA275, RA280, 512.6, 514.2, 518.2, 520.2.

**Does not include** Alloy 535.2 that may contain beryllium (Alcoa MSDS No. 303).

· **Application of the substance / the preparation** Metal-working product

· **Manufacturer/Supplier:**

Alcoa Inc.  
201 Isabella Street  
Pittsburgh, PA 15212-5858 USA  
Health & Safety: +1-412-553-4649

· **Information department:**

For a current MSDS, refer to Alcoa websites: [www.alcoa.com](http://www.alcoa.com) or Internally at [my.alcoa.com](http://my.alcoa.com) EHS Community

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

## 2 Composition/Information on Ingredients:

· **Chemical characterization**

· **Description:**

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

CAS No.	Components:	
7429-90-5	Aluminium	>85%
7439-95-4	Magnesium	<10.7%
7440-66-6	Zinc	<4%
7440-21-3	Silicon	<2.3%
7439-89-6	Iron	<1.9%
7439-96-5	Manganese	<1.5%
7440-02-0	Nickel	<0.5%
7440-47-3	Chromium	<0.4%

· **Additional information** Additional compounds which may be formed (during processing) are listed in Section 8.

## \* 3 Hazards identification

· **EMERGENCY OVERVIEW:**

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 the air.

\* Chips, fines or dust are in contact with water.

\* Dust or fines are in contact with other metal oxides (e.g., rust).

\* Molten metal is in contact with water/moisture or other metal oxides (e.g., rust).

Dust or fume from processing can cause eye, skin and upper respiratory tract irritation or metal fume fever.

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

· **Eyes:** Dust or fume from processing: Can cause irritation to the eyes.

· **Skin:** Dust or fume from processing: Can cause sensitization and allergic contact dermatitis.

### · **Inhalation:**

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

Can cause irritation of the respiratory tract. **Chronic overexposures:** Can cause scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's Disease and reproductive harm in males.

Additional health effects from elevated temperature processing (e.g., welding, melting):

**Acute overexposures:** Can cause metal fume fever (nausea, fever, chills, 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 respiratory sensitization and lung cancer.

### · **Carcinogenicity and Reproductive Hazard**

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

Dust and fumes from mechanical processing: Can present a cancer hazard (Nickel). Can present a reproductive hazard for males (Manganese).

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

### · **Canadian hazard symbol:**

D2A - Very toxic material causing other toxic effects



### · **Medical conditions aggravated by exposure to the product:**

Dust or fume from processing:

Asthma, chronic lung disease, and skin rashes.

Secondary Parkinson's disease

· **Information pertaining to particular dangers for man and environment** See item 11.

## \* 4 First-aid measures

### · **After inhalation**

Dust or fume 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.

### · **After skin contact**

Dust or fume from processing:

Wash with soap and water for at least 15 minutes.

Consult a physician if irritation persists.

### · **After eye contact**

Dust or fume from processing:

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

Consult a physician.

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## \* 5 Fire-fighting measures

- **Fire/Explosion Hazards:** This product does not present fire or explosion hazards as shipped.
- **Suitable extinguishing agents**  
Use Class D extinguishing agents on fines, dust or molten metal.  
Use coarse water spray on chips and turnings.
- **For safety reasons unsuitable extinguishing agents**  
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.

- **Special hazards caused by the material, its products of combustion or resulting gases:**  
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). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
- \* Molten metal in contact with water/moisture or other metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction. Finely divided metals (e.g. powders or wire) may have enough surface oxide to produce thermite reactions/explosions.
- **Protective equipment:**  
Fire fighters should wear NIOSH/CE approved, positive pressure, self- contained breathing apparatus and full protective clothing when appropriate.

## \* 6 Accidental release measures

- **Person-related safety precautions:**



Wear protective clothing.

- **Measures for environmental protection:** No special measures required.
- **Measures for cleaning/collecting:**  
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 metal. Allow the spill to cool before remelting as scrap.

## 7 Handling and storage

- **HANDLING**
- **Information for safe 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.

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· **Information about protection against explosions and fires:**

**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. 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. 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.

Do not use compressed air to remove settled material from floors, beams or equipment.

**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 (i.e., 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 metal 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 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 metal temperature of the coldest item of the batch to 200°C and then hold at that temperature for 6 hours.

· **STORAGE**

· **Requirements to be met by storerooms and receptacles:** No special requirements.

· **Information about storage in one common storage facility:** Not required.

· **Further information about storage conditions:** None.

\* **8 Exposure controls/personal protection**

· **Additional information about design of technical systems:**

If processing occurs which generates dust/fumes:

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

· **Alcoa recommended Occupational Exposure Limit:**

Alcoa recommends an Occupational Exposure Limit for **hexavalent chromium compounds [chromium (VI) - both soluble and insoluble forms]** of 0.25 µg/m<sup>3</sup> TWA as chromium.

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Alcoa recommends an Occupational Exposure Limit for **Nickel compounds** of 0.1 mg/m<sup>3</sup> TWA.

Alcoa recommends an Occupational Exposure Limit for **Manganese** of 0.05 mg/m<sup>3</sup> TWA (total dust) and 0.02 mg/m<sup>3</sup> TWA (respirable).

<b>Components with limit values that require monitoring at the workplace:</b>	
<b>7429-90-5 Aluminium</b>	
EV (ONTARIO) (Canada)	5*, 10** mg/m <sup>3</sup> *Powder/Poudre & fumes/fumées; **Dust/Poussière
EV (QUEBEC) (Canada)	5*, 10** mg/m <sup>3</sup> *Powder/Poudre & fumes/fumées; **Dust/Poussière
ACGIH TLV (USA)	10 mg/m <sup>3</sup> Metal dust
OSHA PEL (USA)	15*; 5** mg/m <sup>3</sup> *Total dust **Respirable fraction
<b>7440-21-3 Silicon</b>	
EV (ONTARIO) (Canada)	10 mg/m <sup>3</sup> Total dust/Poussière totale
EV (QUEBEC) (Canada)	10 mg/m <sup>3</sup> Total dust/Poussière totale
OSHA PEL (USA)	15*; 5** mg/m <sup>3</sup> *Total dust **Respirable fraction
<b>7439-96-5 Manganese</b>	
EV (ONTARIO) (Canada)	Short-term value: 3* mg/m <sup>3</sup> Long-term value: 1*, 0.2** mg/m <sup>3</sup> * Fume/Fumées; ** Dust/Poussières
EV (QUEBEC) (Canada)	Short-term value: 3* mg/m <sup>3</sup> Long-term value: 1*, 0.2** mg/m <sup>3</sup> * Fume/Fumées; ** Dust/Poussières
ACGIH TLV (USA)	0.2 mg/m <sup>3</sup> as Mn
OSHA PEL (USA)	Short-term value: C 5 mg/m <sup>3</sup> fume, as Mn
<b>7440-02-0 Nickel</b>	
EV (ONTARIO) (Canada)	1 mg/m <sup>3</sup>
EV (QUEBEC) (Canada)	1 mg/m <sup>3</sup>
ACGIH TLV (USA)	1.5 mg/m <sup>3</sup> Inhalable
OSHA PEL (USA)	1 mg/m <sup>3</sup>
<b>7440-47-3 Chromium</b>	
EV (ONTARIO) (Canada)	0.5 mg/m <sup>3</sup>
EV (QUEBEC) (Canada)	0.5 mg/m <sup>3</sup>
ACGIH TLV (USA)	0.5 mg/m <sup>3</sup>
OSHA PEL (USA)	1 mg/m <sup>3</sup>
<b>Additional Occupational Exposure Limit Values for possible hazards during processing:</b>	
<b>1344-28-1 Aluminium oxide (non fibrous)</b>	
EV (ONTARIO) (Canada)	10 mg/m <sup>3</sup> Total dust/Poussière totale
EV (QUEBEC) (Canada)	10 mg/m <sup>3</sup> Total dust/Poussière totale
ACGIH TLV (USA)	10 mg/m <sup>3</sup>
OSHA PEL (USA)	15* 5** mg/m <sup>3</sup> *Total dust, **Respirable dust

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<b>Welding fumes</b>	
EV (ONTARIO) (Canada)	5 mg/m <sup>3</sup>
EV (QUEBEC) (Canada)	5 mg/m <sup>3</sup>
<b>10028-15-6 Ozone</b>	
EV (ONTARIO) (Canada)	Short-term value: 0.6 mg/m <sup>3</sup> , 0.3 ppm Long-term value: 0.2 mg/m <sup>3</sup> , 0.1 ppm
ACGIH TLV (1) (USA)	0.20 ppm TWA mg/m <sup>3</sup> Heavy, moderate or light work, ≤ 2 hrs.
ACGIH TLV (2) (USA)	0.05*, 0.08**, 0.1*** ppm *Heavy work, **Moderate work, ***Light work
OSHA PEL (USA)	0.2 mg/m <sup>3</sup> , 0.1 ppm
<b>10102-44-0 Nitrogen dioxide</b>	
EV (ONTARIO) (Canada)	Short-term value: 9.4 mg/m <sup>3</sup> , 5 ppm Long-term value: 5.6 mg/m <sup>3</sup> , 3 ppm
EV (QUEBEC) (Canada)	5.6 mg/m <sup>3</sup> , 3 ppm
ACGIH TLV (USA)	Short-term value: 9.4 mg/m <sup>3</sup> , 5 ppm Long-term value: 5.6 mg/m <sup>3</sup> , 3 ppm
OSHA PEL (USA)	Short-term value: C 9 mg/m <sup>3</sup> , C 5 ppm
<b>10102-43-9 Nitrogen monoxide</b>	
EV (ONTARIO) (Canada)	31 mg/m <sup>3</sup> , 25 ppm
EV (QUEBEC) (Canada)	31 mg/m <sup>3</sup> , 25 ppm
ACGIH TLV (USA)	31 mg/m <sup>3</sup> , 25 ppm BEI
OSHA PEL (USA)	30 mg/m <sup>3</sup> , 25 ppm
<b>1309-48-4 Magnesium oxide</b>	
EV (ONTARIO) (Canada)	10 mg/m <sup>3</sup> Inhalable
EV (QUEBEC) (Canada)	10 mg/m <sup>3</sup> Fume/Fumée, as Mg/comme Mg
ACGIH TLV (USA)	10 mg/m <sup>3</sup> fume
OSHA PEL (USA)	15* mg/m <sup>3</sup> *Total particulate
<b>1314-13-2 Zinc oxide</b>	
EV (ONTARIO) (Canada)	Short-term value: 10* mg/m <sup>3</sup> Long-term value: 2 mg/m <sup>3</sup> *fume/fumée, **total dust/poussière totale
EV (QUEBEC) (Canada)	Short-term value: 10* mg/m <sup>3</sup> Long-term value: 5* 10** mg/m <sup>3</sup> *fume/fumée, **total dust/poussière totale
ACGIH TLV (USA)	Short-term value: 10 mg/m <sup>3</sup> Long-term value: 2 mg/m <sup>3</sup> Respirable fraction
OSHA PEL (USA)	15*; 5** mg/m <sup>3</sup> *Total dust **Respirable dust & fume
<b>69012-64-2 Silica, amorphous</b>	
EV (ONTARIO) (Canada)	2 mg/m <sup>3</sup> Fume/Fumée, respirable
EV (QUEBEC) (Canada)	0.1 mg/m <sup>3</sup>
OSHA PEL (USA)	80 mg/m <sup>3</sup> / %SiO <sub>2</sub> TWA mg/m <sup>3</sup>

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<b>1309-37-1 Iron oxide</b>	
EV (ONTARIO) (Canada)	5 mg/m <sup>3</sup> as Fe, dust & fume/comme Fe, poussières & fumées
EV (QUEBEC) (Canada)	5 mg/m <sup>3</sup> as Fe, dust & fume/comme Fe, poussières & fumées
ACGIH TLV (USA)	5 R mg/m <sup>3</sup>
OSHA PEL (USA)	10 mg/m <sup>3</sup> Fume (Fe <sub>2</sub> O <sub>3</sub> )
<b>Manganese inorganic compounds</b>	
EV (ONTARIO) (Canada)	0.2 mg/m <sup>3</sup> as Mn/comme Mn
EV (QUEBEC) (Canada)	5 mg/m <sup>3</sup> as Mn/comme Mn
ACGIH TLV (USA)	0.2 mg/m <sup>3</sup> as Mn
OSHA PEL (USA)	Short-term value: 5 mg/m <sup>3</sup> as Mn, Ceiling
<b>Nickel insoluble compounds</b>	
EV (ONTARIO) (Canada)	0.2 mg/m <sup>3</sup> as Ni, comme Ni
EV (QUEBEC) (Canada)	1 mg/m <sup>3</sup> as/comme Ni
ACGIH TLV (USA)	0.2 mg/m <sup>3</sup> as Ni, inhalable fraction
OSHA PEL (USA)	1 mg/m <sup>3</sup> as Ni
<b>Chromium II compounds</b>	
EV (ONTARIO) (Canada)	0.5 mg/m <sup>3</sup> as Cr/comme Cr
EV (QUEBEC) (Canada)	0.5 mg/m <sup>3</sup> as Cr/comme Cr
OSHA PEL (USA)	0.5 mg/m <sup>3</sup> as Cr
<b>Chromium III compounds</b>	
EV (ONTARIO) (Canada)	0.5 mg/m <sup>3</sup> as Cr/comme Cr
EV (QUEBEC) (Canada)	0.5 mg/m <sup>3</sup> as Cr/comme Cr
ACGIH TLV (USA)	0.5 mg/m <sup>3</sup> as Cr
OSHA PEL (USA)	0.5 mg/m <sup>3</sup> as Cr

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<b>Chromium VI compounds</b>	
EV (ONTARIO) (Canada)	0.05*, 0.01** mg/m <sup>3</sup> * Soluble, ** Insoluble
EV (QUEBEC) (Canada)	0.05 mg/m <sup>3</sup> as/comme Cr
ACGIH TLV (1) (USA)	0.05 mg/m <sup>3</sup> Water soluble compounds, as Cr
ACGIH TLV (2) (USA)	0.01 mg/m <sup>3</sup> Water insoluble compounds, as Cr
OSHA PEL (USA)	5; 2.5* ug/m <sup>3</sup> *Action level; as Cr

· **Personal protective equipment**

· **Breathing equipment:**

If processing occurs which generates dust/fumes:

Use NIOSH/CE-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8.

Suitable respiratory protective device recommended:

Filter NIOSH N95.

· **Protection of hands:** Wear appropriate gloves to avoid any skin injury.

· **Eye protection:** Safety glasses with full side shields or goggles recommended.

· **Body protection:**

Personnel who handle and work with **molten aluminium** 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 aluminium.

Synthetic materials should never be worn even as secondary clothing (undergarments).

## 9 Physical and chemical properties:

· <b>General Information</b>	
Form:	Solid
Colour:	Silver-coloured
Odour:	Odourless
· <b>Change in condition</b>	
Melting point/Melting range:	482-649°C
Boiling point/Boiling range:	Not applicable
Flash point:	Not applicable
Self igniting:	Product is not self igniting.
Danger of explosion:	Product does not present an explosion hazard.
Density at 20°C:	2.50-3.12 g/cm <sup>3</sup>
· <b>Solubility in / Miscibility with</b>	
Water:	Insoluble
pH-value:	Not applicable
· <b>Solvent content:</b>	
Organic solvents:	0.0 %
Solids content:	100.0 %

## 10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:**

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

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· **Materials to be avoided:**

· **Reactions**

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

\* **With 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.

\* **With heat:** Oxidizes at a rate dependent upon temperature and particle size.

\* **With 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.

\* **With acids and alkalis:** Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).

\* **With halogenated compounds:** Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided aluminium.

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

\* **With iron powder and water:** Explosive reaction forming hydrogen gas when heated above 800°C.

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.

## \* 11 Toxicological information

· **Toxicological Information and Health Effects Associated with Individual Ingredients**

**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)\*.

**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.

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

### HEALTH EFFECTS ASSOCIATED WITH INDIVIDUAL COMPOUNDS FORMED DURING PROCESSING (The following could be expected if welded, remelted or otherwise processed at elevated temperatures)

**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)\*.

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

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

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

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

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

Welding, plasma arc cutting, and arc spray metalizing can generate ozone.

**Ozone** Can cause irritation of eyes, nose and upper respiratory tract. Acute overexposures: Can cause shortness of breath, tightness of chest, headache, cough, nausea and narrowing of airways. Effects are reversible on cessation of exposure. Acute overexposures (high concentrations): Can cause respiratory distress, respiratory tract damage, bleeding and 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)\*.

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).

**Acute toxicity:**

**LD/LC50 values that are relevant for classification:**

<b>7440-21-3 Silicon</b>		
Oral	LD50	3160 mg/kg (Rat)
<b>7439-96-5 Manganese</b>		
Oral	LD50	9000 mg/kg (Rat)
<b>7439-95-4 Magnesium</b>		
Oral	LD50	230 mg/kg (Rat)
<b>7439-89-6 Iron</b>		
Oral	LD50	984 mg/kg (Rat)
<b>7440-02-0 Nickel</b>		
Oral	LD50	>9000 mg/kg (Rat)
<b>1344-28-1 Aluminium oxide (non fibrous)</b>		
Oral	LD50	>5000 mg/kg (Rat)
<b>69012-64-2 Silica, amorphous</b>		
Oral	LD50	>5000 mg/kg (Rat)
Dermal	LD50	>2000 mg/kg (Rabbit)
<b>1314-13-2 Zinc oxide</b>		
Oral	LD50	>5000 mg/kg (Rat)
<b>1309-37-1 Iron oxide</b>		
Oral	LD50	>10000 mg/kg (Rat)
<b>10028-15-6 Ozone</b>		
Inhalative	LC50 4 Hr	4.8 ppm (Rat)

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<b>10102-43-9 Nitrogen monoxide</b>		
Inhalative	LC50 4 Hr	1068 mg/m <sup>3</sup> (Rat)
<b>10102-44-0 Nitrogen dioxide</b>		
Inhalative	LC50 4 Hr	88 ppm (Rat)

· **Primary irritant effect:**

- **on the skin:** Can cause skin irritation.
- **on the eye:** Can cause irritation to the eyes.
- **Inhalation:** Can cause irritation of the respiratory tract.
- **Sensitization:** Sensitizing effect by skin contact is possible with prolonged exposure.

· **Carcinogenicity Classifications**

**Classifications of the Individual Ingredients**

**Nickel (7440-02-0):** IARC Group 2B (Monograph 49, 1990; Supp. 7, 1987); ACGIH A5

**Chromium (7440-47-3):** IARC Group 3 (Monograph 49, 1990; Supp. 7, 1987); ACGIH A4

**Classifications of the Individual Compounds Formed During Processing**

**Silica, amorphous (61790-53-2):** IARC Group 3 (Monograph 68, 1997; Supp. 7, 1987)

**Iron oxide (1309-37-1):** IARC Group 3 (Monograph 1, 1972; Supp. 7, 1987); ACGIH A4

**Nickel Compounds:** IARC Group 1 (Monograph 49, 1990); ACGIH A1; NTP K (Known to be a human carcinogen)

**Chromium (III) compounds:** IARC Group 3 (Monograph 49, 1990; Supp. 7, 1987); ACGIH A4

**Chromium (VI) compounds:** IARC Group 1 (Monograph 49, 1990); ACGIH A1; NTP K (Known to be a human carcinogen)

**Welding fumes:** IARC Group 2B (Monograph 49, 1990)

**Alumina (non-fibrous) (1344-28-1):** ACGIH A4

**Magnesium oxide (1309-48-4):** ACGIH A4

**Ozone (10028-15-6):** ACGIH A4

**Nitrogen dioxide (10102-44-0):** ACGIH A4

· **Description of Classifications**

**IARC 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.

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

**IARC Group 3:** Not classifiable as to carcinogenicity to humans.

**ACGIH A1:** Confirmed Human Carcinogen.

**ACGIH A4:** Not Classifiable as a Human Carcinogen.

**ACGIH A5:** Not Suspected as a Human Carcinogen.

## 12 Ecological information:

· **Ecotoxicological effects:**

· **Aquatic toxicity:**

<b>7440-66-6 Zinc</b>	
EC50 72 Hr	5 ug/L (Water flea [Daphnia pulex])
EC50 96 Hr	30 ug/L (Freshwater algae [S. capricornutum])
LC50 96 Hr	6.4 mg/L (Fathead minnow [Pimephales promelas])
<b>7439-89-6 Iron</b>	
LC50 96 Hr (static)	13.6 mg/L (Striped bass [Morone saxtilis])
<b>7440-02-0 Nickel</b>	
EC50 72 Hr	0.18 mg/L (Freshwater algae [S. capricornutum])
	0.1 mg/L (Fresh water algae [S. subspicatus])
EC50 96 Hr	510 ug/L (Water flea)

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LC50 96 Hr	3.1 mg/L (Fathead minnow [Pimephales promelas]) 31.7 mg/L (Rainbow trout [Oncorhynchus mykiss]) adults >100 mg/L (Brachydanio rerio)
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## \* 13 Disposal considerations

- **Product:**
- **Recommendation**  
If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.
- **Uncleaned packagings:**
- **Recommendation:**  
If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

## \* 14 Transport information

<ul style="list-style-type: none"> <li>· <b>Land transport ADR/RID (cross-border)</b></li> <li>· <b>ADR/RID class:</b> -</li> <li>· <b>Remarks:</b> Not regulated</li> </ul>
<ul style="list-style-type: none"> <li>· <b>Maritime transport IMDG:</b></li> <li>· <b>IMDG Class:</b> -</li> <li>· <b>Marine pollutant:</b> No</li> <li>· <b>Remarks:</b> Not regulated</li> </ul>
<ul style="list-style-type: none"> <li>· <b>Air transport ICAO-TI and IATA-DGR:</b></li> <li>· <b>ICAO/IATA Class:</b> -</li> <li>· <b>Remarks:</b> Not regulated</li> </ul>

- **Transport/Additional information:**  
When Not regulated, enter the proper freight classification, "MSDS Number", and "Product Name" onto the shipping paperwork.
- **Canadian TDG Hazard Class and PIN:** Not regulated

## 15 Regulatory information

- **U.S. Federal Regulations:**
- **TSCA STATUS:** All components of this product are listed on the TSCA inventory.
- **OTHER INFORMATION:**  
All electrical equipment must be suitable for use in hazardous atmospheres involving aluminium 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.  
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.
- **Hazard-determining components of labelling:**  
Nickel
- **International Regulations:**
- **CANADIAN DOMESTIC SUBSTANCES LIST:**  
All components of this product are listed on the Canadian DSL.  
WHMIS Hazard Class: D2A
- **AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES:** All components of this product are listed on the AICS.
- **JAPAN Ministry of International Trade Industry (ENCS):**  
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.

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## \* 16 Other information:

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

### · Department issuing MSDS:

Hazardous Materials Control Committee

Preparer: Jon N. Peace, +1-412-553-2293/Stephanie Williams, +1-412-553-1479

Alcoa Inc., 201 Isabella Street, Pittsburgh, PA 15212-5858 USA

04.04.07 Supersedes 16.03.04

04.04.07: Reviewed on a periodic basis in accordance with Alcoa policy.

Change(s) in Section: 1, 2, 3, 4, 5, 7, 8,10, 11, 12, 13, 14 & 15.

### · Alcoa MS #: 115674

### · Appendix:

The Aluminum Association Inc., 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209. [www.aluminum.org](http://www.aluminum.org).

- NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: +1-800-344-3555)

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

- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations."

- Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association Inc., 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209. [www.aluminum.org](http://www.aluminum.org).

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

- NFPA 77, Standard for Static Electricity

- Guide to Occupational Exposure Values 2006, 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.

- 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.

### · 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

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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

· \* **Data compared to the previous version altered.**

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CDN

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

## WARNING

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

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

Overexposure to fumes (fine dusts) may cause metal fume fever, secondary Parkinson's disease, scarring of the lungs (pulmonary fibrosis), central nervous system damage, the accumulation of fluid in the lungs (pulmonary edema), reduced ability of the blood to carry oxygen (methemoglobin), respiratory sensitization, lung cancer and reproductive harm in males.

WHMIS Hazard Class D2A.

**Precautions:** Avoid generating dust. Use with adequate ventilation. Keep material dry. Use appropriate personal protective equipment (safety glasses/gloves) to avoid injury. Use appropriate NIOSH approved respiratory protection (N95) if concentrations exceed the permissible limits.

**First Aid (Dust or fume from processing):** EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician. SKIN: Wash with soap and water for at least 15 minutes. Consult a physician if irritation persists. INHALATION: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide CPR for persons without pulse or respirations. Consult a physician.

**In case of fire:** Use Class D or dry sand on fines; use coarse water spray on chips, turnings. **DO NOT USE:** Halogenated agents on small chips, dusts or fines, water around molten metal.

Read Alcoa Material Safety Data Sheet No. 686 for more information.  
Emergency Phone: (412) 553-4001.

INGREDIENTS:	CAS Numbers:	INGREDIENTS:	CAS Numbers
Aluminum	(7429-90-5)	Iron	(7439-89-6)
Magnesium	(7439-95-4)	Manganese	(7439-96-5)
Zinc	(7440-66-6)	Nickel	(7440-02-0)
Silicon	(7440-21-3)	Chromium	(7440-47-3)

### Alcoa Inc.

201 Isabella Street, Pittsburgh, PA 15212-5858 USA

04/07 686



# PRODUIT EN LINGOT REFONDU ET EN ALUMINIUM MOULE, ALLIAGES SERIES 5xx.x

## AVERTISSEMENT

**Dangers:** L'humidité de surface ou emprisonnée et d'autres formes de contamination peuvent causer de violentes réactions ou des explosions si le lingot est submergé dans du métal en fusion. Le lingot doit être complètement préchauffé et séché avant le chargement.

Non combustible sous la forme de mise à disposition. De petits fragments, bûchilles et poussières peuvent prendre feu rapidement. Un risque d'explosion peut exister lorsque: (1) de la poussière ou des fines sont répandues dans l'air, (2) des fines, de la poussière ou de l'aluminium fondu entrent en contact avec certains oxydes métalliques (e.g. rouille), ou lorsque (3) des fragments, des fines, de la poussière ou de l'aluminium fondu entrent en contact avec de l'eau ou de l'humidité.

La surexposition aux fumées (fines particules) peut causer la fièvre des fondeurs, maladie de Parkinson secondaire, cicatrisation des poumons, lésion du système neurologique central, accumulation de liquide dans les poumons (œdème pulmonaire), capacité réduite du sang à transporter l'oxygène, sensibilisation des voies respiratoires, cancer du poumon et branche reproductrice masculine.

SIMDUT Classe de danger D2A.

**Précautions:** Evitez de générer de la poussière. Utiliser avec une aération adéquate. Conserver la matière au sec. Utiliser les équipements de protection personnelle nécessaires à éviter le blessure (lunettes de sécurité/gants). Utiliser un appareil respiratoire approprié (N95) si les concentrations dépassent les limites admissibles.

**Premiers soins (poussière ou fumée provoquée par le traitement):** YEUX: Rincer les yeux au moins 15 minutes avec beaucoup d'eau ou une solution saline. Consulter un médecin. PEAU: Laver au moins 15 minutes avec de l'eau et du savon. Consulter un médecin si l'irritation persiste. INHALATION: Emmener à l'air frais. Vérifier si les voies respiratoires sont dégagées, la présence de respiration et du pouls artériel. Tenter une réanimation cardio-respiratoire avec les personnes sans pouls artériel ou en arrêt respiratoire. Consulter un médecin.

**Lutte contre le feu:** Utiliser la classe D ou du sable sec sur les fines ou le métal fondu. Utiliser de l'eau pulvérisée à gros grains sur les copeaux et tournures. **NE PAS UTILISER** d'agents extincteurs halogénés sur de petites particules/petits éclats; d'eau pour combattre le feu autour du métal en fusion.

Pour de plus amples renseignements, lire la fiche de données de sécurité des matières d'Alcoa No. 686.

No. de téléphone d'urgence: (412) 553-4001.

