

Lawrence & Frederick, Inc.
501 E. Lake Street
Streamwood IL 60107 630-289-8300

1. Product Information

Product Trade Name: Wrought Aluminum Products, 5xxx Series Alloy
Product Use: Various fabricated aluminum parts and products.
Synonym(s): 5XXX Series Alloys* C07T, C08N, C10N, C01M, C15N, C16N, C21E, C21N, C22E, C22T, C23N, C240, C27N, C28E, C29E, C29N, C36A, C47P, C498, C51P, C52N, C52P, C53P, C557, C55N, C56N, C584, C585, C586, C591, C59N, C729, C730, C74E, C780, C79P, CT2, CT38, CW49, C45U, C12U, C13U, C09U, C10U, C78U, C57N, C04U, C18T, C37T, C38T, C39T, C42T, C43T, C44T, C83B, C86D, C97C, C56U, C54N, C48P, C84B, C02N, C20T, C802, C30Z, C31Z, C50W, CR56, C12N, C50P, C05A, C33H, C50N, C068, C456F, C466F, C470F, C803, C43H, C79U, C91U, C90U, C77U, C76U, C574F, C83P, C588F, C41T, C59P, C56P, C51N, C53N, C623F, C633F, C618F, C641F, C648F, C652F, X668F, C675F, C2A1, C49P, C566F, C636F, C138H, C139H, C01Z, C3A2, C191H, C207H, C253H, C167, C333H, C351H, C354H, C357H, C352H, C382H, C722, C5A5

Recommended use Various fabricated aluminum parts and products
Recommended Restrictions: Does not include alloys 5058

Emergency Information: Chemtrec 1-800-424-9300, 703-527-3887

2. Hazards Identification

Classification

Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 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.

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Hazardous to the ozone layer Not applicable

OSHA defined hazards Combustible dust

Label elements

Hazard symbol None.

Signal word Warning

Hazard statement: Dust and fines from processing: May form combustible dust concentrations in air.

Precautionary statement

Prevention: Prevent dust accumulation to minimize explosion hazard.

Response: Collect spillage

Storage: Store in a dry place. Keep dry.

Disposal: Reuse or recycle material whenever possible. Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC): None known.

Supplemental information: Non-combustible as supplied. Small chips, fine turnings, dust, fines or particulate from processing may be readily ignitable.

Explosion/fire hazards may be present when:

- Dust, fines or particulate are dispersed in air.
- Molten metal is in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).
- Chips, dust, fines or particulate are in contact with water.
- Dust, fines or particulate are in contact with certain metal oxides (e.g., rust, copper oxide).

3. Composition/Information on Ingredients

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

Mixtures

Chemical name	Common name and synonyms	CAS#	Percent
Aluminum		7429-90-5	> 84.9
Magnesium		7439-95-4	< 6.6
Zinc		7440-66-6	< 4
Manganese		7439-96-5	< 1.9
Silicon		7440-21-3	< 1.5
Iron		7439-89-6	< 1.8
Chromium		7440-47-3	< 1.1
Nickel†		7440-02-0	< 0.1
Lead‡		7439-92-1	0-0.05

Additional Information: All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. †- Present as impurity. While Nickel is not intentionally added to this mixture, it could potentially enter through the recycle stream.

‡- Present as impurity. While lead is not intentionally added to this mixture, it could potentially enter through the recycle stream. Additional compounds which may be formed during processing are listed in Section 8.

4. First Aid Measures

Eye contact: Dust or fume 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 likely, due to the form of the product.

Most important symptoms and effects, both acute and delayed: Dust and fumes from processing: Can cause irritation of the eyes, skin and upper respiratory tract. Additional health effects from elevated temperature processing (e.g., welding, melting): Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise) and the accumulation of fluid in the lungs (pulmonary edema). Contact with residual oil/oil coating: Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis. See Section 11 of the SDS for additional information on health hazards.

Medical conditions aggravated by exposure: Asthma, chronic lung disease, and skin rashes.

Indication of immediate medical attention and special treatment needed; Provide general supportive measures and treat symptomatically.

General advice: If exposed or concerned: Get medical advice/attention.

5. Fire Fighting Measures

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

Unsuitable extinguishing media: DO NOT USE halogenated extinguishing agents on small chips/fines or particulate. DO NOT USE water in fighting fires around molten metal. These fire extinguishing agents will react with the burning material.

Specific hazards arising from the chemical: Small chips, fine turnings, and dust from processing may be readily ignitable. May be a potential hazard under the following conditions:

- Dust, fines or particulate clouds may be explosive. Even a minor dust cloud can explode violently. Dust, fines or particulate accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
- Chips, dust, fines or particulate in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.

- Dust, fines or particulate 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., dust, fines or particulate, powders or wire) may have enough surface oxide to produce thermite reactions/explosions.

Hazardous combustion products: None known.

Special protective equipment and precautions for firefighters: Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

Fire fighting equipment/instructions: For burning metal powder: 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.

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

Explosion data

Sensitivity to mechanical impact: Not sensitive

Sensitivity to static discharge: Take precautionary measures against static discharges when there is a risk of dust explosion.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: 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. Use personal protection recommended in Section 8 of the SDS.

Personal precautions, protective equipment and emergency procedures

For emergency responders: 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. Use personal protection recommended in Section 8 of the SDS.

Evacuation procedures: None necessary.

Methods and materials for containment and cleaning up: Collect scrap for recycling. If molten: Use dry sand to contain the flow of material. 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.

Environmental precautions: No special environmental precautions required.

7. Handling and Storage

Handling: Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Use personal protection equipment recommended in Section 8 of the SDS.

Storage: Keep material dry. 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) brochures listed in Section 16.

Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations. (See Section 15).

Local ventilation and vacuum systems must be designed to handle combustible/explosive dust, fines or particulate. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with combustible/explosive dusts, fines or particulate and must be dedicated to aluminum dust only and should be clearly labeled as such. Vacuum cleaner hoses must be conductive and nozzles or fitting made of conductive, non-sparking material. Do not co-mingle dust, fines or particulate of aluminum with dust, fines or particulate of steel, iron, iron oxide (rust) or other metal oxides.

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.

Avoid all ignition sources. Good housekeeping practices must be maintained. Do not use compressed air to remove settled material from floors, beams or equipment. Do not allow chips, dust, fines or particulate to contact water, particularly in enclosed areas.

Dust, fines or particulate accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Regularly clean building structures, equipment and machinery to avoid accumulation of dust, fines or particulate that could become airborne.

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 (>0.001% or <10 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.

8. Exposure Controls/Personal Protection

Occupational exposure limits

U.S. – OSHA

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m3 15 mg/m3	Respirable fraction Total dust
Chromium (CAS 7440-47-3)	TWA	1 mg/m3	
Nickel† (CAS 7440-02-0)	TWA	1 mg/m3	
Silicon (CAS 7440-21-3)	TWA	5 mg/m3 15 mg/m3	Respirable fraction. Total dust
Compounds formed during processing			
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m3 15 mg/m3	Respirable fraction. Total dust.
Chromium (VI) compounds, certain water insoluble forms	TWA	0.0025 mg/m3	Action Level as Cr(VI))
Iron oxide (CAS 1309-37-1)	TWA	10 mg/m3	Fume.
Manganese compounds, inorganic	Ceiling	5 mg/m3	(as Mn) Fume
Nitric oxide (CAS 10102-43-9)	TWA	30 mg/m3	
Ozone (CAS 10028-15-6)	TWA	25 ppm 0.2 mg/m3	
Silica, amorphous (CAS 112926-00-8)	TWA	0.1 ppm 20 mppcf 80 mg/m3/%SiO2	
Zinc oxide (CAS 1314-13-2)	TWA	5 mg/m3 5 mg/m3 5 mg/m3 15 mg/m3	Respirable fraction. Fume. Total dust.
	TWA (fume)	5mg/m3	Fume
	TWA (total Dust)	15mg/m3	Total dust
Impurities			
Lead compounds, inorganic	TWA	0.05 mg/m3 0.03 mg/m3	(as Pb) Action Level (as Pb)
Nickel compounds, insoluble	TWA	1mg/m3	(as Ni)
Residuals			
Oil mist, mineral (CAS 8012-95-1)	TWA	5mg/m3	Mist

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

Components	Type	Value	Form
Lead‡ (CAS 7439-92-1)	TWA	0.05 mg/m3	
Compounds formed during processing			
Chromium (VI) compounds, certain water insoluble forms	TWA	0.005 mg/m3	as Cr(VI)
Chromium (VI) compounds,	TWA	0.005 mg/m3	

water soluble forms
Chromium (VI) compounds
(CAS 18540-29-9) TWA 0.005 mg/m3

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

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	PEL	5mg/m3	Respirable fraction
Magnesium (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Compounds Formed During Processing			
Chromium (II) compounds	PEL	0.5mg/m3	
Chromium (III) compounds	PEL	0.5mg/m3	
Chromium VI compounds, water soluble forms	PEL	1mg/m3	
Chromium (VI) compounds (CAS 18540-29-9)	PEL	1mg/m3	
Magnesium oxide (CAS 1309-48-4)	PEL	15mg/m3	Total particulate
Nitrogen dioxide (CAS 10102-44-0)	Ceiling	9 mg/m3	
		5 ppm	
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction
		5mg/m3	Fume
		15mg/m3	Total dust
Residuals			
Oil mist, mineral (CAS 8012-95-1)	Type PEL	Value 5mg/m3	Form Mist

US. OSHA Table Z-2 (29 CFR 1910.1000)

Compounds Formed During Processing	Type	Value
Chromium (VI) compounds, water soluble forms	Ceiling	0.1 mg/m3
Chromium (VI) compounds (CAS 18540-29-9)	Ceiling	0.1 mg/m3

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5mg/m3	Respirable fraction
		15mg/m3	Total dust
		50 mppcf	Total dust
		15 mppcf	Respirable fraction
Compounds Formed During Processing			
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5mg/m3	Respirable fraction
		15mg/m3	Total dust
Iron oxide (CAS 1309-37-1)	TWA	5mg/m3	Respirable fraction
		15mg/m3	Total dust
		50 mppcf	Total dust
		15 mppcf	Respirable fraction
Magnesium oxide (CAS 1309-48-4)	TWA	5mg/m3	Respirable fraction
		15mg/m3	Total dust
		50 mppcf	Total dust
		15 mppcf	Respirable fraction

ACGIH

Compounds Formed During Processing	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction, as Al
Ozone (CAS 10028-15-6)	TWA	0.2 ppm	(Heavy, moderate or light workloads (≤2 hours))

US ACGIH Threshold Limit Values: Short Term Exposure Limit (STEL): mg/m3

Compounds Formed During Processing	Type	Value	Form
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3 & ppm

Compounds Formed During Processing	Type	Value	Form
Nitric oxide (CAS 10102-43-9)	TWA	25 ppm	
Nitrogen dioxide (CAS 10102-44-0)	TWA	0.2 ppm	

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

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	
Lead‡ (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.01 mg/m3	Inhalable fraction
Nickel† (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Compounds Formed During Processing	Type	Value	Form
Chromium (III) compounds	TWA	0.5 mg/m3	
Chromium (VI) compounds, certain water insoluble forms	TWA	0.05 mg/m3	
Chromium (VI) compounds, (CAS 18540-29-9)	TWA	0.01 mg/m3	(As Cr)
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Magnesium oxide (CAS 1309-48-4)	TWA	10 mg/m3	Inhalable fraction.
Manganese compounds, inorganic	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Zinc oxide (CAS 1314-13-2)	TWA	2 mg/m3	Respirable fraction.
Impurities	Type	Value	Form
Lead compounds, inorganic	TWA	0.05 mg/m3	
Nickel compounds, insoluble	TWA	0.2 mg/m3	Inhalable fraction
Residuals	Type	Value	Form
Oil mist, mineral (CAS 8012-95-1)	TWA	5 mg/m3	Inhalable fraction

General : 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.

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

Appropriate engineering Controls: Dust and fumes from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in section 8, Exposure Guidelines. Fixed vacuum cleaning and dust collection systems used to convey dust, fines or particulate need to discharge to a collection system located outside the building, designed and protected to prevent injury to personnel and damage to nearby equipment and structures.

Individual protection measures, such as personal protective equipment

Eye/face protection: Wear safety glasses with side shields. Wear a face shield when working with molten metal.

Skin Protection.

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

Other: 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). Dust, fines or particulate: Wear fire/flame resistant/retardant, non-static clothing.

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.

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.

General hygiene considerations: When using, do not eat, drink or smoke. Handle in accordance with good industrial hygiene and safety practice.

Control parameters: Follow standard monitoring procedures.

Environmental exposure controls: No special environmental precautions required.

9. Physical & Chemical Properties

Form: Massive, solid metal

Color: Silver colored

Odor: Odorless

Odor threshold: Not applicable

pH : Not applicable

Density: 2.64-2.72 g/cm³ (0.095-0.098 lb/in³)

Specific gravity: Not available, estimated

Melting Point/Freezing point: 1050-1220°F (565.6-660°C)

Initial boiling point and boiling range: Not determined

Flash point: Not applicable

Evaporation rate: Not applicable

Flammability (solid, gas): Not applicable

Upper/lower flammability or explosive limits

Flammability limit – upper (%): Not applicable

Flammability limit – lower (%): Not applicable

Explosive properties: Dust accumulation from this product may present an explosion hazard in the presence of an ignition source.

Dust explosion properties St class: Very strong explosion.

Vapor Pressure: Not applicable

Vapor Density: Not applicable

Relative density: Not determined

Solubility(ies):

Solubility (water): Insoluble

Partition coefficient: Not applicable

(n-octanol/water): Not applicable

Auto-ignition temperature: Not applicable

Decomposition temperature: Not applicable

Viscosity: Not applicable

10. Chemical Stability & Reactivity Information

Reactivity: The product is stable and non-reactive under normal conditions of use, storage and transport.

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

Possibility of hazardous reactions: Hazardous polymerization does not occur.

Conditions to avoid: Grinding, sanding, buffing and polishing operations may generate potentially explosive aluminum dust, fines or particulate that must not be co-mingled with dust, fines or particulate of steel, iron, iron oxide (rust) or other metal oxides. Vacuum and dust collection systems utilized for processing aluminum must be placarded as follows:

WARNING – Aluminum Metal Only – Fire or Explosion Can Result with Other Metals.

Chips, dust, fines or particulate, 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 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.

Incompatible materials: Chips, fines, dust or particulates 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, dusts or particulates).
 - *Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with chips, dust, fines or particulates 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 ignition. 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 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).

Silicon (inert dusts): Chronic overexposures: Can cause bronchitis and narrowing of the 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 fumes: 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).

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.

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

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

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).

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).

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

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

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 (Chrome 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, the 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).

Information on likely routes of exposure

Eye contact Dust and fumes from processing: Can cause irritation.

Skin contact Dust and fumes from processing: Can cause irritation. Contact with residual oil/oil coating: Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis.

Inhalation Health effects from mechanical processing (e.g., cutting, grinding): Can cause irritation of the upper respiratory tract.

Additional health effects from elevated temperature processing (e.g., welding, melting): Acute overexposure: 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 scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Ingestion Not likely, due to the form of the product.

Symptoms related to the physical, chemical and toxicological characteristics: Health effects from elevated temperature processing (e.g., welding, melting): Acute overexposure: 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 scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Contact with residual oil/oil coating: Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis.

Information on toxicological effects

Components	Species	Test Results
Aluminum (CAS 7429-90-5) Acute Oral LD50	Rat	> 10000 mg/kg > 2000 mg/kg
Nickel (CAS 7440-02-0) Acute Oral LD50	Rat	> 9000 mg/kg
Zinc (CAS 7440-66-6) Acute Oral LD50	Rat	630 mg/kg

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

Skin corrosion/irritation: Non-corrosive

Serious eye damage/irritation: Dust and fume from processing: Direct contact may irritate.

Respiratory or skin sensitization

Respiratory sensitization: Product as shipped: 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. May cause sensitization by inhalation.

Skin sensitization: Dust and fume from processing: Contains nickel. May produce an allergic reaction.

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

Neurological effects: Dust or fume from processing Not classified. Based on available data, the classification criteria are not met.

Carcinogenicity: Product as shipped: Does not present any cancer hazards. Health effects from mechanical processing (e.g., cutting, grinding): Can present a cancer hazard (Lead, Nickel). Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (Hexavalent chromium compounds, Lead compounds, Nickel 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 S-CR3-1): A4 Not classifiable as a human carcinogen
Chromium (VI) compounds (CAS 18540-29-9): A1 Confirmed human carcinogen
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): A1 Confirmed human carcinogen
Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): A1 Confirmed human carcinogen
Iron oxide (CAS 1309-37-1): A4 Not classifiable as a human carcinogen
Lead compounds, inorganic (CAS S-PB-I): 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 (CAS 1309-48-4): A4 Not classifiable as a human carcinogen
Manganese (CAS 7439-96-5): A4 Not classifiable as a human carcinogen
Nickel compounds, insoluble (CAS S-NI-L): 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. A4 Not classifiable as a 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 S-CR3-I): 3 Not classifiable as to carcinogenicity to humans
Chromium (VI) compounds (CAS 18540-29-9): 1 Carcinogenic to humans
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): 1 Carcinogenic to humans
Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): 1 Carcinogenic to humans
Iron oxide (CAS 1309-37-1): 3 Not classifiable as to carcinogenicity to humans
Lead compounds, inorganic (CAS S-PB-I): 2A probably carcinogenic to humans
Lead‡ (CAS 7439-92-1) 2B Possibly carcinogenic to humans.
Nickel compounds, insoluble (CAS S-NI-L): 1 Carcinogenic to humans
Nickel† (CAS 7440-02-0) 1 Carcinogenic to humans.
Silica, amorphous (CAS 112926-00-8): 3 Not classifiable as to carcinogenicity to humans

US OSHA Hazard Categories (10)

Not regulated

US OSHA Categories (9)

Not regulated

US. National Toxicology Program (NTP) Report on Carcinogens

Chromium (VI) compounds (CAS 18540-29-9): Known To Be Human Carcinogen
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Known To Be Human Carcinogen
Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Known To Be Human Carcinogen
Lead compounds, inorganic (CAS S-PB-1): Reasonably Anticipated to be a Human Carcinogen
Lead‡ (CAS 7439-92-1) Reasonably Anticipated to be a Human Carcinogen.
Nickel† (CAS 7440-02-0) Known To Be Human Carcinogen. Reasonably Anticipated to be a 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 18540-29-9): Cancer

Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Cancer

Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Cancer

Reproductive toxicity Product as shipped: Does not present any reproductive hazards. Health effects from mechanical processing (e.g., cutting, grinding): Dust from processing: Can present a reproductive hazard (Lead). Additional health effects from elevated temperature processing (e.g., welding, melting): Dust and fume from processing: Can present a reproductive hazard (Lead compounds, Manganese compounds).

Specific target organ toxicity - single exposure Not classified. Based on available data, the classification criteria are not met.

Specific target organ toxicity – repeated exposure Chronic overexposures: Dust and fume from processing: May cause damage to organs through prolonged or repeated exposure by inhalation.

Aspiration hazard Not an aspiration hazard.

Further information None known

12. Ecological Information

Ecotoxicity This product is not expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.

Product	Species	Test Results
WROUGHT ALUMINUM PRODUCTS, 5xxx SERIES ALLOYS		
Aquatic		
Crustacea	EC50	Daphnia
Fish	LC50	Fish
		0.9053 mg/l, 48 hours, estimated
		2.6927 mg/l, 96 hours, estimated
Components		
Chromium (CAS 7440-47-3)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia magna)
Fish	LC50	Carp (Cyprinus carpio)
		0.01 - 0.7 mg/l, 48 hours
		14.3 mg/l, 96 hours
Iron (CAS 7439-89-6)		
Aquatic		
Crustacea	LC50	Cockle (Cerastoderma edule)
		Common shrimp, sand shrimp (Crangon crangon)
		100 - 330 mg/l, 48 hours
Fish	LC50	Channel catfish (Ictalurus punctatus)
		33 - 100 mg/l, 48 hours
		> 500 mg/l, 96 hours
Lead† (CAS 7439-92-1)		
Aquatic		
Fish	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		1.17 mg/l, 96 hours
Manganese (CAS 7439-96-5)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia magna)
		40 mg/l, 48 hours
Nickel† (CAS 7440-02-0)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia magna)
		1 mg/l, 48 hours

Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>)	2.923 mg/l, 96 hours
Zinc (CAS 7440-66-6)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	2.8 mg/l, 48 hours
Fish	LC50	Rainbow trout, donaldson trout (<i>Oncorhynchus mykiss</i>)	0.56 mg/l, 96 hours

Persistence and degradability The product is not 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: Dispose of in accordance with local regulations.

Contaminated packaging: Dispose of in accordance with local regulations.

14. Transport Information

General Shipping Information

Basic Shipping Information

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 on 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

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.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Chromium (VI) compounds (CAS 18540-29-9): 0.1% Annual Export Notification required
 Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): 0.1% Annual Export Notification required
 Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): 0.1% Annual Export Notification required

CERCLA Hazardous Substance List (40 CFR 302.4)

Chromium (CAS 7440-47-3): Listed.
Chromium (II) compounds (CAS-S-CR2-C): Listed
Chromium (III) compounds (CAS S-CR3-I): Listed
Chromium (VI) compounds (CAS 18540-29-9): Listed
Lead compounds (CAS S-PB-I): Listed
Lead‡ (CAS 7439-92-1): Listed.
Manganese (CAS 7439-96-5): Listed.
Manganese compounds, inorganic (CAS S-MN-C): Listed
Nickel compounds, insoluble (CAS S-NI-L): Listed
Nickel† (CAS 7440-02-0): Listed.
Nitric oxide (CAS 10102-43-9): Listed
Nitrogen dioxide (CAS 10102-44-0): Listed
Zinc (CAS 7440-66-6): Listed.
Zinc oxide (CAS 1314-13-2): Listed

US EPCRA Section 304 Extremely Haz. Subs. & CERCLA Haz. Subs.: Section 304 EHS 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. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Chromium (VI) compounds (CAS 18540-29-9): Cancer
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Cancer
Chromium (VI) compounds, water soluble forms (CAS S-CR5-C): Cancer
Lead compounds, inorganic (CAS S-PB-I): Reproductive toxicity
Lead‡ (CAS 7439-92-1): Reproductive toxicity
Chromium (VI) compounds (CAS 18540-29-9): Eye irritation
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Eye irritation
Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Eye irritation
Lead compounds, inorganic (CAS S-PB-I): Central nervous system
Lead‡ (CAS 7439-92-1): Central nervous system
Chromium (VI) compounds (CAS 18540-29-9): Skin sensitization
Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Skin sensitization
Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Skin sensitization
Lead compounds, inorganic (CAS S-PB-I): Kidney
Lead‡ (CAS 7439-92-1): Kidney
Lead compounds, inorganic (CAS S-PB-I): Blood
Lead‡ (CAS 7439-92-1): Blood
Lead compounds, inorganic (CAS S-PB-I): Acute toxicity
Lead‡ (CAS 7439-92-1): Acute toxicity

US OSHA Hazard Categories (9)

Not regulated

US OSHA Hazard Categories (10)

Not regulated

Superfund Amendments and Reauthorization Act of 1986 (SARA)**Section 311/312 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

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Nitric oxide	10102-43-9	10	100 lbs		
Nitrogen dioxide	10102-44-0	10	100 lbs		
Ozone	10028-15-6	100	100 lbs		

SARA 311/312 Hazardous chemical: Yes

Disclaimer: The user of this SDS should verify the substance specific concentration information as it relates to regulatory reporting. Listed concentrations may cover a range of formulations and process batch variations.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum	7429-90-5	> 84.9
Zinc	7440-66-6	< 4
Manganese	7439-96-5	< 1.9
Chromium	7440-47-3	< 1.1
Nickel†	7440-02-0	< 0.1

US state regulations

US - California Proposition 65

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

Chromium (VI) compounds (CAS 18540-29-9): Listed February 27, 1987

Chromium (VI) compounds, certain water insoluble forms (CAS S-CR5-L): Listed February 27, 1987

Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Listed February 27, 1987

Lead compounds, inorganic (CAS S-PB-I): Listed October 1, 1992

Lead‡ (CAS 7439-92-1): Listed: October 1, 1992

Nickel compounds, insoluble (CAS S-NI-L): Listed May 7, 2004

Nickel† (CAS 7440-02-0): Listed: May 7, 2004

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

Chromium (VI) compounds (CAS 18540-29-9): Listed December 19, 2008

Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Listed December 19, 2008

Chromium (VI) compounds, water soluble forms (CAS S-CR6-C): Listed December 19, 2018

Lead‡ (CAS 7439-92-1): Listed: February 27, 1987

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

Chromium (VI) compounds (CAS 18540-29-9): Listed December 19, 2008

Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Listed December 19, 2008

Chromium (VI) compounds water soluble forms (CAS S-CR6-C): Listed December 19, 2008

Lead‡ (CAS 7439-92-1): Listed: February 27, 1987

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

Chromium (VI) compounds (CAS 18540-29-9): Listed December 19, 2008

Chromium (VI) compounds, certain water insoluble forms (CAS S-CR6-L): Listed December 19, 2008

Chromium (VI) compounds water soluble forms (CAS S-CR6-C): Listed December 19, 2008

Lead‡ (CAS 7439-92-1): Listed: February 27, 1987

International inventories

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)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other Information

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

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 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

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 Systeme d'Information sur les Matieres Dangereuses Utilisees 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

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