SAFETY DATA SHEET

1. Identification

Product identifier **ALUMINUM ANALYTICAL REFERENCE MATERIALS**

Other means of identification

SDS number 1487

Chemical description Mixture

Version # 03

Revision date December 4, 2018.

Other means of identification

Synonyms Certified Reference Materials for Wrought Alloys (High Purity Aluminum, 11xx Alloys, 2xxx Alloys, 3xxx Alloys, 4xxx Alloys, 5xxx Alloys, 6000 Alloys Range Standards, 6xxx Alloys, 7xxx Alloys, 8xxx Alloys) * Certified Reference Materials for Casting Alloys (2xx Alloys, 3xx Alloys, 4xx Alloys, 5xx Alloys, 7xx Alloys, 8xx Alloys) * Certified Reference Materials for Trace Metals (ST Series) * Reference Materials for Calibration and Normalization (SQ-10 through SQ-19) * Certified Reference Materials for Individual Elements (Si Series, Fe Series, Cu Series, Mn Series, Ni Series, Zn Series, Ti Series, Bn Series, Be Series, Ca Series, Cd Series, Co Series, Ga Series, Li Series, Na Series, P Series, Sb Series, Zr Series) * A copy of the Arconic Spectrochemical Reference Materials product catalog may be obtained at: http://www.arconic.com/crms

Recommended use Analytical test medium

Recommended Restrictions For industrial use only. For grinding, use closed system.

Manufacturer/Importer/Supplier/Distributor information

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Website For a current Safety Data Sheet, refer to Arconic websites: www.arconic.com or internally at https://arconic.sharepoint.com/sites/arconnect EHS Community.

2. Hazard(s) identification

Classification

The classification and hazards associated with this product may change depending on the form.

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.

Physical hazards Not classified.

Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 1B
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Hazardous to the ozone layer	Not applicable

OSHA defined hazards Combustible dust

Label elements

Signal word Danger

Hazard statement May cause an allergic skin reaction. May cause cancer by inhalation. May damage fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure by inhalation. May form combustible dust concentrations in air.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Do not eat, drink or smoke when using this product.

Response If exposed or concerned: Get medical advice/attention.
IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. Get medical advice/attention if you feel unwell.

Storage Keep dry. Store in a dry place.

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

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

Supplemental information None.

Specific hazards Non-combustible as supplied. Small chips, fine turnings, and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information):
• Dust or fines are dispersed in air.
• Chips, dust or fines are in contact with water.
• Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).
• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust or fume from processing Can cause irritation of the eyes, skin and upper respiratory tract and metal fume fever.

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 number	%
Aluminum		7429-90-5	>50
Silicon		7440-21-3	≤50
Iron		7439-89-6	≤11
Zinc		7440-66-6	≤11
Copper		7440-50-8	≤10
Magnesium		7439-95-4	≤8.0
Tin		7440-31-5	≤7.0
Nickel		7440-02-0	≤3.0
Manganese		7439-96-5	≤3.0
Silver		7440-22-4	≤1.0
Lead		7439-92-1	≤1.0
Chromium		7440-47-3	≤0.50
Titanium		7440-32-6	≤0.50
Zirconium		7440-67-7	≤0.35
Beryllium		7440-41-7	≤0.31

Chemical name	Common name and synonyms	CAS number	%
Vanadium		7440-62-2	≤0.30
Cobalt		7440-48-4	≤0.25
Antimony		7440-36-0	≤0.20
Arsenic		7440-38-2	≤0.04
Cadmium		7440-43-9	≤0.03

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

4. First-aid measures

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

Skin contact Dust and fume from processing or contact with lubricant/residual oil: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Inhalation Dust and fumes from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

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

Most important symptoms/effects, acute and delayed Dust and fumes from processing: Health effects from mechanical processing (e.g., cutting, grinding): Dust: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes), respiratory sensitization, scarring of the lungs (pulmonary fibrosis), weakness in the extremities, abdominal cramps, kidney damage, liver damge, lung cancer, damage to the heart muscle (cardiomyopathy) and reproductive harm.

Additional health effects from elevated temperature processing (e.g., welding, melting): Acute overexposure: Can cause metal fume fever (nausea, fever, shortness of breath and malaise), the accumulation of fluid in the lungs (pulmonary edema) and reduced ability of the blood to carry oxygen (anemia). Chronic overexposures: Chronic overexposures: Can cause benign lung disease (siderosis), respiratory sensitization, central nervous system damage, secondary Parkinson's disease, perforation of the nasal septum, asthma, and lung cancer. Contains (Cobalt, Nickel, Beryllium). May produce an allergic reaction.

Medical conditions aggravated by exposure Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information If exposed or concerned: get medical attention/advice.

5. Fire-fighting measures

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

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

Specific hazards arising from the chemical May be a potential hazard under the following conditions:
• Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
• Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.
• Dust and fines in contact with certain metal oxides (e.g., rust, copper oxide). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermite reactions/explosions.
Thermite reactions can also occur with oxides of lead, copper, iron, bismuth and certain other metals.

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

Fire fighting equipment/instructions	Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. If impossible to extinguish, protect surroundings and allow fire to burn itself out. Apply extinguishing media carefully to avoid creating airborne dust.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Non-combustible as supplied. Small chips, fine turnings, and dust from processing may be readily ignitable. Dust or fines dispersed in the air can be explosive.
Explosion data	
Sensitivity to mechanical impact	Not applicable.
Sensitivity to static discharge	Take precautionary measures against static discharges when there is a risk of dust explosion.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Avoid generating dust. Avoid contact with skin and eyes. Avoid contact with sharp edges or heated metal. Molten, heated and cold aluminum look alike; do not touch unless you know it is cold. For personal protection, see Section 8 of the SDS.
Personal precautions, protective equipment and emergency procedures	
For emergency responders	Molten, heated and cold aluminum look alike; do not touch unless you know it is cold. Avoid generating dust. Avoid contact with skin and eyes. Avoid contact with sharp edges or heated metal. Use personal protection recommended in Section 8 of the SDS.
Evacuation procedures	None necessary.
Methods and materials for containment and cleaning up	Avoid generating dust. 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	Reuse or recycle material whenever possible.

7. Handling and storage

Handling	Keep material dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red. Handling and processing operations should be conducted in accordance with 'best practices' (e.g. NFPA-654). When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Use personal protection recommended in Section 8 of the SDS.
Storage	Store in a dry place. Keep material dry.
Requirements for Processes Which Generate Dusts or Fines	If processing of this product generates dust or if extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) standards listed in Section 16. Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15). Local ventilation and vacuum systems must be designed to handle explosive metal dusts (Group E dusts per NFPA and the National Electric Code). Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive Group E dusts. Dust collection systems must be dedicated to the specific metal only and should be clearly labeled as such. Do not co-mingle fines of aluminum or aluminum alloys 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. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. 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 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.

Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:
• Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
• Store materials in dry, heated areas with any cracks or cavities pointed downwards.
• Preheat and dry large items adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal temperature of the coldest item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.

Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	
Silicon (CAS 7440-21-3)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust
Silver (CAS 7440-22-4)	TWA	0.01 mg/m3	
Titanium (CAS 7440-32-6)	TWA	5 mg/m3	Respirable fraction
		15 mg/m3	Total dust
Vanadium (CAS 7440-62-2)	TWA	5 mg/m3	Respirable fraction
		15 mg/m3	Total dust

Compounds Formed During Processing	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Cobalt compounds, inorganic	TWA	0.1 mg/m3	(for metal dust/fume)
Lead compounds, inorganic	TWA	0.05 mg/m3	(as Pb)
		0.03 mg/m3	Action Level (as Pb)
Manganese compounds, inorganic	Ceiling	5 mg/m3	(as Mn) Fume
Nickel compounds, insoluble	TWA	1 mg/m3	(as Ni)
Nitric oxide (CAS 10102-43-9)	TWA	30 mg/m3	
		25 ppm	
Ozone (CAS 10028-15-6)	TWA	0.2 mg/m3	
		0.1 ppm	
Vanadium pentoxide (CAS 1314-62-1)	Ceiling	0.5 mg/m3	(respirable dust)

U.S. - OSHA

Residuals	Type	Value	Form
Oil mist, mineral (CAS 8012-95-1)	TWA	5 mg/m3	Mist.

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

Components	Type	Value
Arsenic (CAS 7440-38-2)	TWA	0.01 mg/m3
Beryllium (CAS 7440-41-7)	STEL	0.002 ppm
	TWA	0.0002 mg/m3
Cadmium (CAS 7440-43-9)	TWA	0.005 mg/m3
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

Compounds Formed During Processing	Type	Value
Beryllium compounds	STEL	0.002 ppm
	TWA	0.0002 mg/m3
Chromium (VI) compounds, certain water insoluble forms	TWA	0.005 mg/m3
Chromium (VI) compounds, water soluble forms	TWA	0.005 mg/m3
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	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Antimony (CAS 7440-36-0)	PEL	0.5 mg/m3	
Chromium (CAS 7440-47-3)	PEL	1 mg/m3	
Cobalt (CAS 7440-48-4)	PEL	0.1 mg/m3	Dust and fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

Compounds Formed During Processing	Type	Value	Form
Antimony compounds	PEL	0.5 mg/m3	
Chromium (II) compounds	PEL	0.5 mg/m3	
Chromium (III) compounds	PEL	0.5 mg/m3	
Cobalt compounds, inorganic	PEL	0.1 mg/m3	Dust and fume.
Iron oxide (CAS 1309-37-1)	PEL	10 mg/m3	Fume.
Magnesium oxide (CAS 1309-48-4)	PEL	15 mg/m3	Total particulate.
Nitrogen dioxide (CAS 10102-44-0)	Ceiling	9 mg/m3	
		5 ppm	
Titanium dioxide (CAS 13463-67-7)	TWA	15 mg/m3	Total dust.
Vanadium pentoxide (CAS 1314-62-1)	Ceiling	0.5 mg/m3	Respirable dust.
		0.1 mg/m3	Fume.
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction.
		5 mg/m3	Fume.
		15 mg/m3	Total dust.

Residuals	Type	Value	Form
Oil mist, mineral (CAS 8012-95-1)	PEL	5 mg/m3	Mist.

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

Components	Type	Value	Form
Beryllium (CAS 7440-41-7)	Ceiling	0.005 mg/m3	
	TWA	0.002 mg/m3	
Cadmium (CAS 7440-43-9)	Ceiling	0.6 mg/m3	Dust.
		0.3 mg/m3	Fume.
	TWA	0.2 mg/m3	Dust.
		0.1 mg/m3	Fume.

Compounds Formed During Processing	Type	Value
Beryllium compounds	Ceiling	0.005 mg/m3
	TWA	0.002 mg/m3

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

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

Compounds Formed During Processing	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Silica, amorphous (CAS 61790-53-2)	TWA	0.8 mg/m3	
		20 mppcf	
Iron oxide (CAS 1309-37-1)	TWA	15 mg/m3	Total dust.
Magnesium oxide (CAS 1309-48-4)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

ACGIH

Components	Type	Value	Form
Cadmium (CAS 7440-43-9)	TWA	0.01 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	(Dust and Mist)
		0.2 mg/m3	Fume
Titanium (CAS 7440-32-6)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust
Vanadium (CAS 7440-62-2)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust

Compounds Formed During Processing	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction, as Al
Cobalt compounds, inorganic	TWA	0.02 mg/m3	(as Co)
		0.02 mg/m3	(as metal)
Ozone (CAS 10028-15-6)	TWA	0.2 ppm	(Heavy, moderate or light workloads (≤2 hours))
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	Total dust

ACGIH

Compounds Formed During Processing	Type	Value	Form
Vanadium pentoxide (CAS 1314-62-1)	TWA	0.05 mg/m3	(inhalable fraction)

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Antimony (CAS 7440-36-0)	TWA	0.5 mg/m3	
Arsenic (CAS 7440-38-2)	TWA	0.01 mg/m3	
Beryllium (CAS 7440-41-7)	TWA	0.00005 mg/m3	Inhalable fraction.
Cadmium (CAS 7440-43-9)	TWA	0.01 mg/m3	
		0.002 mg/m3	Respirable fraction.
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	Inhalable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Silver (CAS 7440-22-4) Tin	TWA	0.1 mg/m3	Dust and fume.
(CAS 7440-31-5) Zirconium	TWA	2 mg/m3	
(CAS 7440-67-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Compounds Formed During Processing	Type	Value	Form
Antimony compounds	TWA	0.5 mg/m3	
Beryllium compounds	TWA	0.00005 mg/m3	Inhalable fraction.
Chromium (III) compounds	TWA	0.003 mg/m3	Inhalable fraction.
Chromium (VI) compounds, certain water insoluble forms	STEL	0.0005 mg/m3	Inhalable fraction.
	TWA	0.01 mg/m3	(as Cr)
		0.0002 mg/m3	Inhalable fraction.
Chromium (VI) compounds, water soluble forms	STEL	0.0005 mg/m3	Inhalable fraction.
	TWA	0.0002 mg/m3	Inhalable fraction.
Chromium (VI) compounds (CAS 18540-29-9)	STEL	0.0005 mg/m3	Inhalable fraction.
	TWA	0.0002 mg/m3	Inhalable fraction.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Lead compounds, inorganic	TWA	0.05 mg/m3	
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.
Nickel compounds, insoluble	TWA	0.2 mg/m3	Inhalable fraction.
Nitric oxide (CAS 10102-43-9)	TWA	25 ppm	
Nitrogen dioxide (CAS 10102-44-0)	TWA	0.2 ppm	
Vanadium pentoxide (CAS 1314-62-1)	TWA	0.05 mg/m3	Inhalable fraction.
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

US. ACGIH Threshold Limit Values

Compounds Formed During Processing	Type	Value	Form
Zirconium compounds (CAS 7440-67-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Residuals	Type	Value	Form
Oil mist, mineral (CAS 8012-95-1)	TWA	5 mg/m3	Inhalable fraction.

Arconic

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust
Beryllium (CAS 7440-41-7)	STEL	1 µg/m3	Peak/ Inhalable
	TWA	0.2 µg/m3	Inhalable
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	Inhalable fraction
Manganese (CAS 7439-96-5)	TWA	0.05 mg/m3	Total dust.
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	

Compounds Formed During Processing	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Beryllium compounds	TWA	0.2 µg/m3	Soluble
Chromium (VI) compounds, certain water insoluble forms	TWA	0.25 ug/m3	
Cobalt compounds, inorganic	TWA	0.02 mg/m3	(as metal)
		0.02 mg/m3	(as Co)
Manganese compounds, inorganic	TWA	0.05 mg/m3	Total dust, as Mn.
		0.02 mg/m3	Respirable fraction, as Mn.
Nickel compounds, insoluble	TWA	0.1 mg/m3	Insoluble

Residuals	Type	Value	Form
Oil mist, mineral (CAS 8012-95-1)	TWA	0.5 mg/m3	(8 Hour)

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Arsenic (CAS 7440-38-2)	35 µg/l	Inorganic arsenic, plus methylated metabolites, as As	Urine	*
Cadmium (CAS 7440-43-9)	5 µg/g	Cadmium	Creatinine in urine	*
	5 µg/l	Cadmium	Blood	*
Cobalt (CAS 7440-48-4)	15 µg/l	Cobalt	Urine	*

Compounds Formed During Processing	Value	Determinant	Specimen	Sampling Time
Chromium (VI) compounds, water soluble forms	25 µg/l	Total chromium	Urine	*
	10 µg/l	Total chromium	Urine	*

ACGIH Biological Exposure Indices

Compounds Formed During Processing	Value	Determinant	Specimen	Sampling Time
Chromium (VI) compounds (CAS 18540-29-9)	25 µg/l	Total chromium	Urine	*
	10 µg/l	Total chromium	Urine	*
Cobalt compounds, inorganic	15 µg/l	Cobalt	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US ACGIH Threshold Limit Values: Skin designation

Chromium (VI) compounds (CAS 18540-29-9)	Can be absorbed through the skin.
Chromium (VI) compounds, water soluble forms (CAS S~CR6~C)	Can be absorbed through the skin.

General

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 exposure assessments should be conducted by a qualified Industrial Hygienist for all tasks involving welding, cutting and grinding. Engineering controls or other measures (e.g., approved respiratory protection) may be necessary to reduce dust and beryllium concentrations depending on the exposure potential.

The presence of airborne beryllium has been detected during the welding of aluminum alloys with beryllium content as low as 0.002% by weight.

In accordance with OSHA 29 CFR 1910.252: Welding or cutting operations involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposures is within the acceptable concentrations defined by 29 CFR 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

Use personal protective equipment as required. Good industrial hygiene practices, including reducing beryllium exposures to the greatest extent possible, are recommended. Beryllium work areas should be established where employees are exposed to beryllium levels above the occupational exposure limits recommended by Arconic or where the potential exists for significant skin contact with dusts containing beryllium. Access to these work areas should be restricted and the number of employees exposed to beryllium should be limited.

Adequate protective work clothing should be provided to employees in beryllium work areas to prevent contamination of personal clothing. This work clothing should not be worn outside the work area. Special laundering practices should be followed (e.g., separation of contaminated clothing, use of water soluble laundry bags) and personnel assigned to launder contaminated clothing shall be advised of beryllium's presence and potential health effects.

Good housekeeping and personal hygiene practices should be implemented. Dry cleaning of dust (e.g., broom sweeping, use of compressed air) should not be permitted. When vacuuming, equipment specifically certified for use with flammable/explosive dusts and utilizing high efficiency particulate (HEPA) filters are required. Food, tobacco and cosmetic products should be prohibited in the work area. Employees in beryllium work areas should be required to shower at the end of the work shift.

Medical surveillance is recommended for all employees exposed to >0.1 ug/m3 beryllium as a TWA or >1.0 ug/m3 beryllium as a STEL. Surveillance should include baseline chest X-rays (periodic as required by a physician) and annual respiratory history, spirometry, and serum beryllium lymphocyte proliferation tests (BeLPT). Employees sensitized or showing symptoms of beryllium related disease should be restricted from further exposure to beryllium.

Appropriate engineering controls

If dust and fumes are generated through processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles). Wear a face shield when working with molten material. Molten metal: Tinted safety glasses or face shield.

Skin protection

Hand protection	Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury. When handling hot material, use heat resistant gloves.
Other	The need for personal protective equipment should be based upon a hazard assessment: and recommendations from health / safety professionals. 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 and fumes from processing: Avoid contact with the skin. Wear impervious gloves to avoid direct skin contact. Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury.
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	Wear appropriate thermal protective clothing, when necessary. When material is heated, wear gloves to protect against thermal burns.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. Appropriate exposure assessments should be conducted by a qualified Industrial Hygienist for all tasks involving welding, cutting and grinding. Engineering controls or other measures (e.g., approved respiratory protection) may be necessary to reduce dust and beryllium concentrations depending on the exposure potential. Wash hands and face before breaks and immediately after handling the product. When using, do not eat, drink or smoke. 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.
Control parameters	Appropriate exposure assessments should be conducted by a qualified Industrial Hygienist for all tasks (i.e., handling beryllium laden dust). Engineering controls or other measures (e.g., approved respiratory protection) may be necessary to reduce dust and beryllium concentrations depending on the exposure potential. Follow standard monitoring procedures.
Environmental exposure controls	None known.

9. Physical and chemical properties

Form	Massive, solid metal.
Color	Silver colored.
Odor	Odorless
Odor threshold	Not applicable
pH	Not applicable
Density	2.70 - 2.80 g/cm3 (0.098 - 0.101 lb/in3)
Melting point/freezing point	1000 - 1150 °F (537.78 - 621.11 °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 clouds may be explosive under certain conditions.

Dust explosion properties	
St class	1 (Non-spherical and irregular shaped powders>20 microns) 2 (dependent on particle size, distribution, shape and concentration <20 microns) 3 (dependent on particle size, distribution, shape and concentration <20 microns)
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not determined
Solubility(ies)	Insoluble
Partition coefficient (n-octanol/water)	Not applicable. Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	Not applicable
Viscosity	Not applicable

10. Stability and reactivity

Reactivity Chemical	The product is stable and non-reactive under normal conditions of use, storage and transport.
stability Possibility of	Stable under normal conditions of use, storage, and transportation as shipped.
hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Chips, fines, dust and molten metal are considerably more reactive with the following: • Heat: Oxidizes at a rate dependent upon temperature and particle size. • Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Molten metal can react violently/explosively with water or moisture, particularly when the water is entrapped.
Incompatible materials	Chips, fines, dust and molten metal are considerably more reactive with the following: • Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten. • Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). • Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum. • Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. Molten aluminum can react violently with iron oxide without external ignition source. Thermite reactions can occur with oxides of lead, copper, iron, bismuth and certain other metals. • 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

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).

Zirconium compounds: Skin contact (prolonged or repeated): Can cause lumps on the skin (granulomas).

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 chronic bronchitis and narrowing of airways.

Copper dust/mists: Can cause irritation of the eyes, mucous membranes, skin, and respiratory tract. Chronic overexposures: Can cause reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes) and hair discoloration.

Copper fume: Can cause irritation of the eyes, mucous membranes, and respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise).

Tin (dust or fume): Chronic overexposures: Can cause benign lung disease (stannosis).

Silver: Can cause irritation of eyes, mucous membranes and skin. Chronic overexposures: Can cause irreversible blue-gray discoloration of mucous membranes, eyes and skin (argyria).

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).

Titanium: Generally considered to be biologically inert.

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.

Beryllium studies with experimental animals by inhalation have found lung tumors. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1).

Beryllium: Can cause lung sensitization in susceptible individuals. Skin contact: Can cause irritant dermatitis, allergic contact dermatitis and lumps on the skin (granulomas). Acute overexposures: Can cause inflammation of the lung tissues (Acute Beryllium Disease). Acute Beryllium Disease can be fatal but is unlikely to occur when processing beryllium-containing aluminum alloys.

Chronic exposures: Chronic inhalation of dust and fumes by sensitized individuals can result in a serious, progressive disease called Chronic Beryllium Disease (CBD). This disease is an allergic condition in which the lung tissues become inflamed. This inflammation, sometimes accompanied with scarring of the lungs (pulmonary fibrosis), restricts the uptake of oxygen into the blood stream. CBD can, over time, be fatal.

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

Antimony compounds: Can cause irritation of eyes, skin and mucous membranes. Chronic overexposures: Can cause dermatitis, weight loss, hair loss, perforation of the nasal septum, chemical pneumonia, liver damage and kidney damage. Ingestion Can cause abdominal cramps, diarrhea, dizziness, abnormal heart rhythm (arrhythmia) and death.

Cadmium dust, fumes and mist: Can cause severe irritation of respiratory tract. Acute overexposures: Can cause metal fume fever (shortness of breath and malaise), inflammation of the lung tissue and fluid in the lungs (pulmonary edema). Effects can be delayed for several hours. Chronic overexposures: Can cause lung damage, renal tube damage, placenta damage, testicular damage, liver damage, fetal malformations, reduction in the number of red blood cells (anemia), high blood pressure (hypertension), emphysema and central nervous system effects. Can accumulate in the body over time. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1). Cadmium and cadmium compounds: Associated with lung tumors, prostate tumors, kidney tumors and testicular tumors.

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.

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.

Nickel compounds: Can cause irritation of eyes, skin and respiratory tract. 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 and asthma. 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).

Manganese compounds: 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.

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).

Copper fume: Can cause irritation of the eyes, mucous membranes, and respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise).

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

Tin compounds, inorganic (dust or fume): Can cause irritation of eyes, skin and respiratory tract.

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).

Zirconium compounds: Skin contact (prolonged or repeated): Can cause lumps on the skin (granulomas).

Chromium (III) compounds: Can cause irritation of eye, skin and respiratory tract. IARC/NTP: Not classifiable as to their carcinogenicity to humans by IARC.

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

Titanium dioxide: Can cause irritation of eyes and respiratory tract. Chronic overexposures: Can cause chronic bronchitis. IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B).

Vanadium pentoxide: Can cause irritation of eyes, skin and respiratory tract. Skin contact (prolonged or repeated): Can cause sensitization and dermatitis. Acute overexposures: Can cause inflammation of the eyes and eyelids (conjunctivitis), bronchitis and fluid in the lungs (pulmonary edema). Effects can be delayed up to 3 days. Chronic overexposures: Can cause kidney damage, blindness, asthma and emphysema. IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B).

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

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

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.

Oxides of nitrogen (NO and NO2): Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause reduced ability of the blood to carry oxygen (methemaglobin). Can cause cough, shortness of breath, accumulation of fluid in the lungs (pulmonary edema) and death. Effects can be delayed up to 2-3 weeks.
Nitrogen dioxide (NO2): Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis).

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).

General information Not available.

Routes of exposure Inhalation. Skin contact. Eye contact.

Information on likely routes of exposure

Eye contact Product as shipped: Not applicable. Dust and fumes from processing: Can cause mechanical irritation. Direct contact: Can cause irritation and inflammation of the eyes and eyelids (conjunctivitis).

Skin contact Dust and fumes from processing: Contains (Cobalt, Nickel, Beryllium). May produce an allergic reaction.
Dust and fumes from processing: Can cause irritation.

Inhalation Product as shipped: Not classified. Based on available data, the classification criteria are not met. Under normal conditions of intended use, this material is not expected to be an inhalation hazard. If dust and fumes are generated through processing: May cause irritation to the respiratory system. Can cause reduction in the number of red blood cells, skin abnormalities (pigmentation changes), scarring of the lungs (pulmonary fibrosis), respiratory sensitization, central nervous system damage, reproductive harm, benign lung disease, weakness in the extremities, damage to the heart muscle (cardiomyopathy), liver damage, kidney damage and lung cancer skin abnormalities.

Additional health effects from elevated temperature processing (e.g., welding, melting): Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Chronic overexposures: Can cause benign lung disease, Secondary Parkinson's disease, respiratory sensitization, asthma, the accumulation of fluid in the lungs (pulmonary edema), reproductive harm, chronic bronchitis, kidney damage, nasal cancer, damage to the heart muscle (cardiomyopathy), lung damage and lung cancer.

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

Information on toxicological effects

Components	Species	Test Results
Aluminum (CAS 7429-90-5)		
Acute		
Oral		
LD50	Rat	> 10000 mg/kg
		> 2000 mg/kg
Cadmium (CAS 7440-43-9)		
Acute		
Oral		
LD50	Rat	225 mg/kg
Nickel (CAS 7440-02-0)		
Acute		
Oral		
LD50	Rat	> 9000 mg/kg
Silver (CAS 7440-22-4)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg

Acute toxicity Dust and fumes from processing: Harmful by inhalation.

Aspiration hazard Not applicable. Based on available data, the classification criteria are not met.

Chronic effects Health effects from mechanical processing (e.g., cutting, grinding): Cancer hazard. Can cause cancer. May cause sensitization by skin contact. Contains a substance/a group of substances which may impair fertility. Prolonged or repeated overexposure causes lung damage. Can cause reduction in the number of red blood cells (anemia) and skin abnormalities (pigmentation changes). Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. Contains nickel, which can cause lung or nasal cancer. Long-term breathing of this material may cause chronic lung disease. Contains lead. Danger of cumulative effects (may cause damage to blood, kidneys and the nervous system). Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Lead: Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic antimony: Chronic overexposure to inorganic antimony may cause damage to heart, blood, and other organs. Cadmium and cadmium compounds: Cadmium and cadmium compounds may cause fatal liver and/or kidney damage and may cause respiratory tract cancer.

Health effects from elevated temperature processing (e.g., welding, melting): Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (Beryllium compounds, Cobalt compounds, Hexavalent chromium compounds, Lead compounds,). Can present a reproductive hazard (Nickel compounds, Oil mist mineral).
Asthma, pulmonary sensitization. Contains a substance/a group of substances with possible risk of harm to the unborn child and with possible risk of impaired fertility. May cause central nervous system effects. May cause lung damage. Manganese compounds: 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.

Nickel compounds: Nickel causes sensitization by skin contact. Studies indicate that some forms of nickel are carcinogenic to humans. Prolonged skin contact may cause skin irritation and/or dermatitis. Risk of sensitization or allergic reactions among sensitive individuals. Severe overexposure may cause cardiac sensitization and result in irregular rhythm. Trivalent chromium: Chronic dermatitis has been reported in workers handling trivalent chromium compounds.

Carcinogenicity Product as shipped: Does not present any cancer hazards.

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

Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (Beryllium compounds, Cobalt compounds, Hexavalent chromium compounds, Lead compounds, Nickel compounds, Oil mist, mineral,).

IARC Monographs. Overall Evaluation of Carcinogenicity

Arsenic (CAS 7440-38-2) 1 Carcinogenic to humans.

Beryllium (CAS 7440-41-7)	1 Carcinogenic to humans.
Beryllium compounds (CAS S~BE~C)	1 Carcinogenic to humans.
Cadmium (CAS 7440-43-9)	1 Carcinogenic to humans.
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 (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Lead compounds, inorganic (CAS S~PB~I)	2A Probably carcinogenic to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Nickel compounds, insoluble (CAS S~NI~L)	1 Carcinogenic to humans.
Silica, amorphous (CAS 61790-53-2)	3 Not classifiable as to carcinogenicity to humans.
Titanium dioxide (CAS 13463-67-7)	2B Possibly carcinogenic to humans.
Vanadium pentoxide (CAS 1314-62-1)	2B Possibly carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Arsenic (CAS 7440-38-2)	Cancer
Beryllium (CAS 7440-41-7)	Cancer
Beryllium compounds (CAS S~BE~C)	Cancer
Cadmium (CAS 7440-43-9)	Cancer
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

US. National Toxicology Program (NTP) Report on Carcinogens

Arsenic (CAS 7440-38-2)	Known To Be Human Carcinogen.
Beryllium (CAS 7440-41-7)	Known To Be Human Carcinogen.
Beryllium compounds (CAS S~BE~C)	Known To Be Human Carcinogen.
Cadmium (CAS 7440-43-9)	Known To Be Human Carcinogen.
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.
Cobalt (CAS 7440-48-4)	Reasonably Anticipated to be a Human Carcinogen.
Lead (CAS 7439-92-1)	Reasonably Anticipated to be a Human Carcinogen.
Lead compounds, inorganic (CAS S~PB~I)	Reasonably Anticipated to be a Human Carcinogen.
Nickel (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.
Oil mist, mineral (CAS 8012-95-1)	Known To Be Human Carcinogen.

Germ cell mutagenicity
Classification not possible. Due to partial or complete lack of data the classification is not possible.

Reproductivity
Product as shipped: Does not present any reproductive hazards.
Health effects from mechanical processing (e.g., cutting, grinding): Can present a reproductive hazard (Cobalt, Lead`).
Additional health effects from elevated temperature processing (e.g., welding, melting): Can present a reproductive hazard (Manganese compounds, Lead compounds, Cobalt compounds, Hexavalent chromium compounds).

Skin corrosion/irritation
Non-corrosive. Dust and fumes from processing: May be irritating to the skin.

Serious eye damage/eye irritation
Dust and fume from processing: Can cause mechanical irritation.

Neurological effects
Dust from processing: Central and/or peripheral nervous system damage. Health effects from elevated temperature processing (e.g., welding, melting): May cause central nervous system effects.

Respiratory or skin sensitization
Dust and fumes from processing: Contains (Cobalt, Nickel). May produce an allergic reaction. Contains (Beryllium). May produce an allergic reaction. May cause sensitization by inhalation and skin contact.

ACGIH sensitization

BERYLLIUM AND COMPOUNDS, SOLUBLE AND INSOLUBLE COMPOUNDS, AS BE, INHALABLE FRACTION (CAS 7440-41-7)	Respiratory sensitization

BERYLLIUM AND COMPOUNDS, SOLUBLE AND INSOLUBLE COMPOUNDS, AS BE, INHALABLE FRACTION (CAS S~BE~C)	Respiratory sensitization
HARD METALS CONTAINING COBALT AND TUNGSTEN CARBIDE, THORACIC FRACTION, AS CO (CAS 7440-48-4)	Respiratory sensitization
HEXAVALENT CHROMIUM WATER SOLUBLE INORGANIC COMPOUNDS, INCLUDING CHROMITE ORE PROCESSING, AS CR (VI), INHALABLE FRACTION (CAS 18540-29-9)	Dermal sensitization
	Respiratory sensitization
HEXAVALENT CHROMIUM WATER SOLUBLE INORGANIC COMPOUNDS, INCLUDING CHROMITE ORE PROCESSING, AS CR (VI), INHALABLE FRACTION (CAS S~CR6~C)	Dermal sensitization
	Respiratory sensitization

Respiratory sensitization Dust and fumes from processing: May cause sensitization by inhalation. Contains: (Beryllium, Cobalt, Nickel). May produce an allergic reaction.

Skin sensitization Product as shipped: Dust and fumes from processing: May cause an allergic skin reaction.

Contact with residual oil/oil coating: Prolonged skin contact may cause skin irritation and/or dermatitis. Direct contact may irritate.

Specific target organ toxicity - single exposure Dust and fumes from processing: May cause irritation to the respiratory system. Acute overexposure: Can cause metal fume fever (nausea, chills, fever, shortness of breath and malaise).

Specific target organ toxicity - repeated exposure Chronic overexposures: Dust and fumes from processing: Causes damage to organs through prolonged or repeated exposure by inhalation.

Symptoms Product as shipped: Not classified. Based on available data, the classification criteria are not met. Under normal conditions of intended use, this material is not expected to be an inhalation hazard. If dust and fumes are generated through processing: May cause irritation to the respiratory system. Can cause reduction in the number of red blood cells, skin abnormalities (pigmentation changes), scarring of the lungs (pulmonary fibrosis), respiratory sensitization, central nervous system damage, reproductive harm, benign lung disease, weakness in the extremities, damage to the heart muscle (cardiomyopathy), liver damage, kidney damage and lung cancer skin abnormalities.

Additional health effects from elevated temperature processing (e.g., welding, melting): Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Chronic overexposures: Can cause benign lung disease, Secondary Parkinson's disease, respiratory sensitization, asthma, the accumulation of fluid in the lungs (pulmonary edema), reproductive harm, chronic bronchitis, kidney damage, nasal cancer, damage to the heart muscle (cardiomyopathy), lung damage and lung cancer.

Symptoms Dust and fumes from processing: Direct contact: Can cause irritation and inflammation of the eyes and eyelids (conjunctivitis).

Dust and fumes from processing: Prolonged or repeated skin contact may cause irritation, allergic contact dermatitis and sensitization.

Pre-existing conditions aggravated by exposure Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Components		Species	Test Results
Antimony (CAS 7440-36-0)			
Aquatic			
Fish	LC50	Sheepshead minnow (Cyprinodon variegatus)	6.2 - 8.3 mg/l, 96 hours
Arsenic (CAS 7440-38-2)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	9.9 mg/l, 96 hours

Components		Species	Test Results
Cadmium (CAS 7440-43-9)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.05 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0 - 0 mg/l, 96 hours
Chromium (CAS 7440-47-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.01 - 0.7 mg/l, 48 hours
Fish	LC50	Carp (Cyprinus carpio)	14.3 mg/l, 96 hours
Copper (CAS 7440-50-8)			
Aquatic			
Algae	LC50	Green algae (Scenedesmus dimorphus)	0.08 mg/l, 1 days
			0.06 mg/l, 9 days
Crustacea	EC50	Water flea (Daphnia magna)	0.04 mg/l, 48 hours
Fish	LC50	Channel catfish (Ictalurus punctatus)	0.04 - 0.1 mg/l, 96 hours
Iron (CAS 7439-89-6)			
Aquatic			
Crustacea	LC50	Cockle (Cerastoderma edule)	100 - 330 mg/l, 48 hours
		Common shrimp, sand shrimp (Crangon crangon)	33 - 100 mg/l, 48 hours
Fish	LC50	Channel catfish (Ictalurus punctatus)	> 500 mg/l, 96 hours
Lead (CAS 7439-92-1)			
Aquatic			
Crustacea	LC50	Water flea (Ceriodaphnia reticulata)	0.53 mg/l, 48 hours
		Water flea (Daphnia magna)	3.6 - 5.3 mg/l, 48 hours
		Water flea (Daphnia pulex)	5.1 mg/l, 48 hours
		Water flea (Simocephalus vetulus)	3.6 - 5.5 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	542 mg/l, 96 hours
			471 mg/l, 96 hours
			1.17 mg/l, 96 hours
			0.2 mg/l, 336 hours
			0.17 - 15.61 mg/l, 28 days
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 (Pimephales promelas)	2.92 mg/l, 96 hours
Silver (CAS 7440-22-4)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	0 - 0 mg/l, 96 hours
Zinc (CAS 7440-66-6)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	2.8 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.56 mg/l, 96 hours

Persistence and degradability	The product contains inorganic compounds which are not biodegradable.
Bioaccumulative potential	Bioaccumulation is unlikely to be significant because of the low water solubility of this product.
Mobility in soil	Not considered mobile.
Mobility in general	Not considered mobile.
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. Keep scrap separate from other metal scrap.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Waste codes	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 arsenic, cadmium, chromium, lead, and silver in a waste disposal scenario.
Waste from residues / unused products	If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.
Contaminated packaging	Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

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

General Shipping Notes

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

Disclaimer

This section of the SDS provides basic classification information for transport, and where relevant, it also provides information with respect to specific modal regulations, environmental hazards (e.g., marine pollutant), and special precautions to the user. Otherwise it is to be presumed that the information is not available or 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.
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Antimony (CAS 7440-36-0)	Listed.
Arsenic (CAS 7440-38-2)	Listed.
Beryllium (CAS 7440-41-7)	Listed.
Cadmium (CAS 7440-43-9)	Listed.
Chromium (CAS 7440-47-3)	Listed.
Copper (CAS 7440-50-8)	Listed.
Lead (CAS 7439-92-1)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Nickel (CAS 7440-02-0)	Listed.
Silver (CAS 7440-22-4)	Listed.
Zinc (CAS 7440-66-6)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Arsenic (CAS 7440-38-2)	Cancer
Beryllium (CAS 7440-41-7)	Cancer

Beryllium compounds (CAS S~BE~C)	Cancer
Cadmium (CAS 7440-43-9)	Cancer
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
Lead (CAS 7439-92-1)	Reproductive toxicity
Lead compounds, inorganic (CAS S~PB~I)	Reproductive toxicity
Arsenic (CAS 7440-38-2)	Liver
Beryllium (CAS 7440-41-7)	lung effects (CBD and acute beryllium disease)
Beryllium compounds (CAS S~BE~C)	lung effects (CBD and acute beryllium disease)
Cadmium (CAS 7440-43-9)	Lung
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 (CAS 7439-92-1)	Central nervous system
Lead compounds, inorganic (CAS S~PB~I)	Central nervous system
Arsenic (CAS 7440-38-2)	Skin
Beryllium (CAS 7440-41-7)	beryllium sensitization
Beryllium compounds (CAS S~BE~C)	beryllium sensitization
Cadmium (CAS 7440-43-9)	Kidney
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 (CAS 7439-92-1)	Kidney
Lead compounds, inorganic (CAS S~PB~I)	Kidney
Arsenic (CAS 7440-38-2)	Respiratory irritation
Beryllium (CAS 7440-41-7)	Skin sensitization
Beryllium compounds (CAS S~BE~C)	Skin sensitization
Cadmium (CAS 7440-43-9)	Acute toxicity
Lead (CAS 7439-92-1)	Blood
Lead compounds, inorganic (CAS S~PB~I)	Blood
Arsenic (CAS 7440-38-2)	Nervous system
Beryllium (CAS 7440-41-7)	skin, eye, and respiratory tract irritation
Beryllium compounds (CAS S~BE~C)	skin, eye, and respiratory tract irritation
Lead (CAS 7439-92-1)	Acute toxicity
Lead compounds, inorganic (CAS S~PB~I)	Acute toxicity
Arsenic (CAS 7440-38-2)	Acute toxicity

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 (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum	7429-90-5	>50

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Beryllium	7440-41-7	≤0.31
Cobalt	7440-48-4	≤0.25
Copper	7440-50-8	≤10
Lead	7439-92-1	≤1.0
Manganese	7439-96-5	≤3.0
Nickel	7440-02-0	≤3.0
Silver	7440-22-4	≤1.0
Zinc	7440-66-6	≤11

US state regulations

California Proposition 65

WARNING: This product can expose you to chemicals including Cadmium, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Arsenic (CAS 7440-38-2)	Listed: February 27, 1987
Beryllium (CAS 7440-41-7)	Listed: October 1, 1987
Cadmium (CAS 7440-43-9)	Listed: October 1, 1987
Cobalt (CAS 7440-48-4)	Listed: July 1, 1992
Lead (CAS 7439-92-1)	Listed: October 1, 1992
Nickel (CAS 7440-02-0)	Listed: October 1, 1989

California Proposition 65 - CRT: Listed date/Developmental toxin

Cadmium (CAS 7440-43-9)	Listed: May 1, 1997

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

Cadmium (CAS 7440-43-9)	Listed: May 1, 1997

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Aluminum (CAS 7429-90-5)
Antimony (CAS 7440-36-0)
Arsenic (CAS 7440-38-2)
Beryllium (CAS 7440-41-7)
Cadmium (CAS 7440-43-9)
Chromium (CAS 7440-47-3)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Iron (CAS 7439-89-6)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silver (CAS 7440-22-4) Tin (CAS 7440-31-5) Vanadium (CAS 7440-62-2) Zinc (CAS 7440-66-6)

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)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Toxic Chemical Substances (TCS)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
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).

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.

16. Other information, including date of preparation or last revision

SDS Status December 4, 2018: Change(s) in Section: 2, 11, 15 and 16 (USA CA Proposition 65 information added).
June 14, 2018: Change(s) in Section: 2, 4, 5, 6, 7, 8,11,15 and 16.
June 21, 2017: Change(s) in Section: 1, 2, 11 and 16.
May 5, 2017: Change(s) in Section: 1, 2, 3, 4, 8, 11, 15 and 16.
November 17, 2016: New SDS.
Hazardous Materials Control Committee
+1-865-977-2140

Revision date December 4, 2018.

Version # 03

Revision information Product and Company Identification: Product and Company Identification
Hazard(s) identification: Hazard statement
Composition / Information on Ingredients: Disclosure Overrides
Fire-fighting measures: Specific hazards arising from the chemical
Physical & Chemical Properties: Multiple Properties
Physical and chemical properties: Form
Toxicological information: 003 - Health effects associated with ingredients formed during processin g Toxicological information: Eye contact
Toxicological information: Symptoms
Toxicological information: Skin contact
Toxicological information: Symptoms
Transport Information: Agency Name, Packaging Type, and Transport Mode Selection
Regulatory Information: United States
GHS: Qualifiers

Further information Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.

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

Other information

• Aluminum Association’s Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
• Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
• NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
• NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
• NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
• NFPA 77, Standard for Static Electricity, • NFPA 68, Standard on Explosion Protection by Deflagration Venting, • NFPA 69, Standard on Explosion Prevention Systems
• Guide to Occupational Exposure Values 2016, 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 2007.
• expub, Expert Publishing, LLC., www.expub.com

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 Cardio-
CPR	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 Environmental
EPA	Protective Agency International Agency for
IARC	Research on Cancer Lethal Concentration
LC LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of SDS ***

Danger

Hazard statement

May cause an allergic skin reaction. May cause cancer by inhalation. May damage fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure by inhalation. May form combustible dust concentrations in air.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Do not eat, drink or smoke when using this product.

Response

If exposed or concerned: Get medical advice/attention.
IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Get medical advice/attention if you feel unwell.

Storage

Keep dry. Store in a dry place.

Disposal

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

Supplemental information

Non-combustible as supplied. Small chips, fine turnings and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when:
• Dust or fines are dispersed in air.
• Chips, dust, fines or particulate are in contact with water.
• Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).
• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Contains (Cobalt, Nickel, Beryllium). May produce an allergic reaction. Dust and fume from processing: Can cause irritation of the eyes, skin and upper respiratory tract and metal fume fever. Direct contact: Can cause irritation and inflammation of the eyes and eyelids (conjunctivitis). Prolonged or repeated skin contact may cause irritation, allergic contact dermatitis, and sensitization.

Dust from mechanical processing: Chronic overexposures: Can cause reduction in the number of red blood cells, skin abnormalities, scarring of the lungs, respiratory sensitization, central nervous system damage, reproductive harm, benign lung disease, weakness in the extremities, damage to the heart muscle, liver damage, kidney damage and lung cancer.

Health effects from elevated temperature processing (e.g., welding, melting): Acute overexposure: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise), the accumulation of fluid in the lungs and reduced ability of the blood to carry oxygen. Chronic overexposures: Can cause benign lung disease, Secondary Parkinson's disease, skin sensitization, respiratory sensitization, reproductive harm, chronic bronchitis, kidney damage, nasal cancer, damage to the heart muscle, lung damage and lung cancer.

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

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

IN CASE OF SPILL: 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. Pick up mechanically.

See Arconic SDS Number 1487.

CHEMTREC: +1-703-527-3887 or +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); Arconic: +1-563-459-2201 (24 Hour Emergency Telephone, only English spoken)

California Proposition 65

WARNING: This product can expose you to chemicals including Cadmium, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.