

Aluminum Alloys

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations
Date of Issue: 08/30/2023

Version: 1.0

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: Aluminum Alloys

Synonyms: Al

1.2. Intended Use of the Product

Use of the Substance/Mixture: No use is specified.

1.3. Name, Address, and Telephone of the Responsible Party

Distributor

ThyssenKrupp Materials NA, Inc.

22355 W. Eleven Mile Road

Southfield, Michigan 48034

TEL: 248-233-5681

1.4. Emergency Telephone Number

Emergency Number : 248-233-5681

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

GHS-US Classification

Classification as delivered:

Not classified

Classification Intended Use (Physical alteration resulting in dust, fines, and chips):

Flammable solids Category 1	H228
Substances and mixtures which in contact with water emit flammable gases Category 2	H261
Acute toxicity (inhalation:dust,mist) Category 1	H330
Respiratory sensitization, Category 1B	H334
Skin sensitization, Category 1	H317
Germ cell mutagenicity Category 2	H341
Carcinogenicity Category 1B	H350
Reproductive toxicity, Additional category, Effects on or via lactation	H362
Specific target organ toxicity (repeated exposure) Category 1	H372
Hazardous to the aquatic environment – Acute Hazard Category 1	H400
Hazardous to the aquatic environment – Chronic Hazard Category 1	H410
Combustible Dust	

Full text of hazard classes and H-statements: see section 16

Classification Intended Use (Extreme heat resulting in fumes):

Specific target organ toxicity (repeated exposure) Category 1	H372
Respiratory sensitization, Category 1B	H334
Skin sensitization, Category 1	H317
Germ cell mutagenicity Category 2	H341
Carcinogenicity Category 1B	H350
Reproductive toxicity, Additional category, Effects on or via lactation	H362
Specific target organ toxicity (repeated exposure) Category 1	H372

Full text of hazard classes and H-statements: see section 16

2.2. Label Elements

GHS-US Labeling

Classification as delivered:

Not classified

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Classification Intended Use (Physical alteration resulting in dust, fumes, fines, and chips):

Hazard Pictograms (GHS-US)

:



GHS02



GHS06



GHS08



GHS09

Signal Word (GHS-US)

: Danger

Hazard Statements (GHS-US)

: May form combustible dust concentrations in air.
H228 - Flammable solid.
H261 - In contact with water releases flammable gas.
H317 - May cause an allergic skin reaction.
H330 - Fatal if inhaled.
H334 - May cause an allergy or asthma symptoms or breathing difficulties if inhaled.
H341 - Suspected of causing genetic defects.
H350 - May cause cancer.
H362 - May cause harm to breast-fed children.
H372 - Causes damage to organs through prolonged or repeated exposure.
H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.

Precautionary Statements (GHS-US)

: P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P223 - Do not allow contact with water.
P231+P232 - Handle under inert gas. Protect from moisture.
P240 - Ground/Bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, and lighting equipment.
P260 - Do not breathe dust, fume.
P263 - Avoid contact during pregnancy/while nursing.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P272 - Contaminated work clothing must not be allowed out of the workplace.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, and eye protection.
P284 - [In case of inadequate ventilation] wear respiratory protection.
P302+P352 - If on skin: Wash with plenty of water.
P304+P340 - If inhaled: Remove person to fresh air and keep at rest in a position comfortable for breathing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P320 - Specific treatment is urgent (see section 4 on this SDS).
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
P335+P334 - Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.
P342+P311 - If experiencing respiratory symptoms: Call a poison center or doctor.
P363 - Wash contaminated clothing before reuse.
P370+P378 - In case of fire: Use appropriate media (see section 5) to extinguish.
P391 - Collect spillage.
P402+P404 - Store in a dry place. Store in a closed container.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with local, regional, national, and international regulations.

Supplemental Information

: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Proper grounding procedures to avoid static electricity should be followed. Prevent dust accumulation (to minimize explosion hazard). Avoid generating dust.

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2.3. Other Hazards

This product is physiologically inert in its massive form. However, user-generated dust and/or fumes may pose a physiological hazard if inhaled or ingested. Avoid inhalation of metal dusts and fumes. May cause an influenza-like illness. Avoid skin and eye contact with dusts to prevent mechanical irritation. User-generated dust is easily ignited and difficult to extinguish. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath. Molten material may produce fumes that are toxic, or irritating, and may cause metal fume fever. When machined or physically altered material may produce dusts or ribbons that may be irritating or harmful. Risk of thermal burns on contact with molten product.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

Name	Synonyms	Product Identifier	%	GHS US classification
Aluminum	Aluminium / Aluminium metal / Aluminium, metal / Aluminum metal / Aluminum, elemental / Aluminum, metal / C.I. 77000 / CI 77000 / Aluminium powder (stabilised) / Aluminium powder (stabilized) / Aluminium powder / Pigment Metal 1 / Aluminum powder / Aluminium metal, powder / aluminum	(CAS-No.) 7429-90-5	80 – 99.7	Flam. Sol. 1, H228 Water-react. 2, H261 Combustible Dust
Silicon	Silicon powder / Silicon powder, amorphous / SILICON / silicon	(CAS-No.) 7440-21-3	10 – 20	Combustible Dust
Copper	Copper, metallic / Pigment Metal 2 / Copper metal / CI 77400 / Copper, elemental / C.I. Pigment Metal 2 / C.I. 77400 / Granulated copper / copper	(CAS-No.) 7440-50-8	1 – 20	Aquatic Acute 1, H400 Aquatic Chronic 1, H410 Combustible Dust
Cobalt	Cobalt, elemental / Cobalt metal / C.I. 77320 / Cobalt metallic	(CAS-No.) 7440-48-4	0.1 – 10	Flam. Sol. 2, H228 Acute Tox. 4 (Oral), H302 Acute Tox. 1 (Inhalation:dust,mist), H330 Resp. Sens. 1B, H334 Skin Sens. 1, H317 Muta. 2, H341 Carc. 1B, H350 Repr. 1B, H360 Aquatic Chronic 4, H413 Combustible Dust
Zinc oxide (ZnO)	Zinc oxide / C.I. 77947 / C.I. Pigment White 4 / Zinc White / CI 77947 / Pigment White 4	(CAS-No.) 1314-13-2	1 – 10	Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Tin	Tin metal / Tin, elemental / Tin, metal / TIN / tin / Organometallic tin	(CAS-No.) 7440-31-5	1 – 10	Combustible Dust
Manganese	Manganese, elemental / Manganese metal / manganese	(CAS-No.) 7439-96-5	1 – 10	Flam. Sol. 2, H228 STOT RE 1, H372 Aquatic Acute 2, H401 Aquatic Chronic 2, H411 Combustible Dust

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Lead	C.I. Pigment Metal 4 / Lead metal / Lead, elemental / C.I. 77575	(CAS-No.) 7439-92-1	1 – 10	Carc. 1B, H350 Lact., H362 Repr. 1A, H360 STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 Combustible Dust
Nickel	Nickel metal / Nickel, elemental / Nickel, metallic / Nickel, metal / C.I. 77775	(CAS-No.) 7440-02-0	0 – 2.4	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 3, H412 Combustible Dust
Silver	C.I. 77820 / Silver, elemental / Silver, metal / CI 77820 / Silver metal / Silver, metallic / Nanoscale silver / Nanosilver / Metallic silver / Silver nanomaterials	(CAS-No.) 7440-22-4	0.1 – 1	Aquatic Acute 1, H400 Aquatic Chronic 1, H410 Combustible Dust

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of First-aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Removal of solidified material from skin, eyes, or mouth requires medical assistance. The health effects listed below are not likely to occur unless dust or fumes are generated by processing.

First-aid Measures After Inhalation: First, take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate respiratory protective equipment, use the buddy system), then remove the exposed person to fresh air. Keep at rest in a position comfortable for breathing. Using proper respiratory protection, move the exposed person to fresh air at once. Encourage exposed person to cough, spit out, and blow nose to remove dust. Immediately call a poison center, physician, or emergency medical service. Immediately call a poison center or doctor/physician.

First-aid Measures After Skin Contact: *Normal handling:* Immediately remove contaminated clothing. Wash affected area with soap and water for at least 15 minutes. Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages. If exposed or concerned: Get medical advice/attention. *In molten form:* Cool skin rapidly with cold water after contact with molten product. Removal of solidified molten material from skin requires medical assistance. Obtain medical attention if irritation/rash develops or persists.

First-aid Measures After Eye Contact: *Contact with solid product or product dusts:* Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists. Removal of solidified molten material from the eyes requires medical assistance. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention. *Contact with molten material:* Removal of solidified molten material from the eyes requires medical assistance.

First-aid Measures After Ingestion: Rinse mouth. Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

4.2. Most Important Symptoms and Effects Both Acute and Delayed

Symptoms/Injuries: As shipped this product is not expected to be hazardous to human health. If physically altered resulting in dust, fumes, fines, and chips the following health hazards may apply: The primary acute health hazard associated with this product would be the potential for exposure to fumes during metal processing operations. May cause cancer. Causes damage to organs through prolonged or repeated exposure. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Skin sensitization. Suspected of causing genetic defects. May cause harm to breast-fed children. Fatal if inhaled. *In molten form:* Risk of thermal burns on contact with molten product. Prolonged contact with large amounts of dust may cause mechanical irritation. This product contains lead and nickel. Exposure to small chips, fine turnings, and dust from processing may cause cancer.

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Symptoms/Injuries After Inhalation: During processing, the most significant route of exposure is by the inhalation (breathing) of fumes. If fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza; Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Exposure may produce cough, mucous secretions, shortness of breath, chest tightness or other symptoms indicative of an allergic/sensitization reaction. Inhalation of this material can cause serious health effects in small amounts, leading to unconsciousness and death. Dust may be harmful or cause irritation. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

Symptoms/Injuries After Skin Contact: Direct contact may cause irritation by mechanical abrasion. Contact with hot, molten metal will cause thermal burns. May cause an allergic skin reaction. Contact with fumes or metal powder will irritate skin. Contact with hot, molten metal will cause thermal burns.

Symptoms/Injuries After Eye Contact: During metal processing, dusts caused from physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes. Risk of thermal burns on contact with molten product.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: In massive form, no chronic hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material: May cause cancer. May cause harm to breast-fed children. Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis. Silicon: Can cause chronic bronchitis and narrowing of the airways. Copper: Overexposure to fumes may cause metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude); metallic or sweet taste; discoloration of skin and hair. Tissue damage of mucous membranes may follow chronic dust exposure. Cobalt: Chronic exposure to cobalt-containing hard metal (dust or fume) can result in a serious lung disease called "hard metal lung disease", which is a type of pneumoconiosis (lung fibrosis). Zinc: Prolonged exposure to high concentrations of zinc fumes may cause "zinc shakes", an involuntary twitching of the muscles. Otherwise, zinc is non-toxic. Tin: Has been shown to increase incidence of sarcoma in animal tests. Chronic exposure to tin dusts and fume may result in "stannosis", a mild form of pneumoconiosis. Manganese: Chronic exposure can cause inflammation of the lung tissue, scarring the lungs (pulmonary fibrosis). Chronic exposure to excessive manganese levels can lead to a variety of psychiatric and motor disturbances, termed manganism. Lead: Exposure can result in lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; encephalopathy; kidney disease; hypertension. Inhalation of Nickel compounds has been shown in studies to provide an increased incidence of cancer of the nasal cavity, lung and possibly larynx in nickel refinery workers. Silver: Chronic skin contact or ingestion of silver dust, salts or fume can result in a condition known as Argyria, a condition with bluish pigmentation of the skin and eyes. Skin sensitization. Causes damage to organs through prolonged or repeated exposure. Suspected of causing genetic defects. Overexposure to metal fumes may result metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude), disturbances in smell and/or taste, and possible discoloration of skin, hair and mucous membranes; discoloration may become permanent.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: For metal fires, dry sand, graphite, or dry table salt may be used. Use class D extinguishing media on fines, dust, or molten metal. Dry chemical powder, alcohol-resistant foam, carbon dioxide (CO₂). *As shipped:* Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use halogenated extinguishing agents on small chips or fines. Do not use water when molten material is involved, contact of hot product with water will result in a violent expansion as the water turns to steam causing explosion with massive force.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: *In massive form:* Not flammable. Dust, chips, or ribbons can be ignited more easily, by an ignition source, by improper machining, or by spontaneous combustion if finely divided and damp. Small chips, turnings, dust and fines from processing may be readily ignitable. Reacts readily with water to produce flammable gases which may ignite and cause a fire. Flammable solid. Molten material may react violently with water forming explosive or flammable reactions.

Explosion Hazard: Product itself is not explosive but if dust is generated, dust clouds suspended in air can be explosive. Reacts readily with water to emit flammable gases which could ignite and possibly cause an explosion. Dust explosion hazard in air. Molten material may react violently with water forming explosive or flammable reactions.

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Reactivity: *As shipped:* Stable under normal storage conditions. Dust and other forms of product formed from processing might react with water producing a flammable/explosive environment, especially in confined spaces. Molten material will react violently with water. Reacts readily with water liberating highly flammable gases. Reacts violently with strong oxidizers. Increased risk of fire or explosion.

5.3. Advice for Firefighters

Precautionary Measures Fire: Under fire conditions, hazardous fumes will be present. Exercise caution when fighting any chemical fire.

Firefighting Instructions: Do not breathe fumes from fires or vapours from decomposition. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Firefighters must use full bunker gear including NIOSH-approved positive-pressure self-contained breathing apparatus to protect against potential hazardous combustion and decomposition products. Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Metallic oxides.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses. Risk of dust explosion.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Remove ignition sources. Use only non-sparking tools. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Do not breathe dust. Do not breathe fumes from molten product. Do not get in eyes, on skin, or on clothing. Avoid generating dust. Where possible allow molten material to solidify naturally.

6.1.1. For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Avoid creating or spreading dust. Evacuate unnecessary personnel. Stop leak if safe to do so.

6.1.2. For Emergency Personnel

Protective Equipment: Wear suitable protective clothing, gloves and eye/face protection. Equip cleanup crew with proper protection.

Emergency Procedures: Eliminate ignition sources. Evacuate unnecessary personnel, isolate, and ventilate area. Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit.

6.2. Environmental Precautions

Notify authorities if liquid enters sewers or public waters. Prevent entry to sewers and public waters. Avoid release to the environment. Collect spillage. Avoid release of dust/fines to waterways to avoid potential bioaccumulation.

6.3. Methods and Materials for Containment and Cleaning Up

For Containment: Remove ignition sources. Ventilate area. Use only non-sparking tools. As an immediate precautionary measure, isolate spill or leak area in all directions. Contain and collect as any solid. Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Avoid generation of dust during clean-up of spills. If metal is in molten form allow to cool and collect as a solid. If metal is in solid form collect for re-melting purposes. Recycle or dispose of in compliance with current legislation.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. *For dust spills:* Use only non-sparking tools. Use explosion proof vacuum during cleanup, with appropriate filter. Do not mix with other materials. Vacuum clean-up is preferred. If sweeping is required use a dust suppressant. Cool molten material to limit spreading. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See Section 8 for Exposure Controls and Personal Protection and Section 13 for Disposal Considerations. See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

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SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Product dust is combustible. Use care during processing to minimize generation of dust. Warning! Contains lead. When immersed in furnace, splashing of molten metal can occur. Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions. All tooling and containers which come in contact with molten metal must be preheated or specially coated and rust free. Molds and ladles must be preheated or oiled prior to casting. Any surfaces that may contact molten metal (e.g. concrete) should be specially coated. Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards. During melting operations, the following minimum guidelines should be observed:

- Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400 °F (204 °C) and then hold at that temperature for 6 hours. Keep away from any possible contact with water, because of violent reaction and possible flash fire. Avoid dust production. Accumulation and dispersion of dust with an ignition source can cause a combustible dust explosion. Keep dust levels to a minimum and follow applicable regulations. May be a potential hazard under the following conditions: Small chunks, dust or fines in contact with water can generate flammable or toxic gases. These gases could present an explosion hazard in confined or poorly ventilated spaces. Finely divided metals (e.g. powders or wire) may have enough surface oxide to produce thermite reactions/explosions. If suspected of containing moisture, product should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Risk of thermal burns on contact with molten product.

Precautions for Safe Handling: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Protect from moisture. Take precautionary measures against static discharge. Use only non-sparking tools. Do not get in eyes, on skin, or on clothing. Avoid contact during pregnancy/while nursing. Use only outdoors or in a well-ventilated area. Avoid creating or spreading dust. Keep away from heat, sparks, open flames, and hot surfaces. No smoking. Do not breathe dust or fumes.

Hygiene Measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Take action to prevent static discharges. Ground and bond container and receiving equipment. Use explosion-proof electrical, ventilating, and lighting equipment. Avoid creating or spreading dust. Use explosion-proof electrical, ventilating, lighting equipment.

Storage Conditions: Store in original container. Store in dry protected location to prevent any moisture contact. Keep away from heat and flame. Store locked up/in a secure area. Keep away from moisture, extremely high or low temperatures, ignition sources, and incompatible materials. Store in a well-ventilated place. Keep container tightly closed. Keep in fireproof place.

Incompatible Materials: Corrosive substances in contact with metals may produce flammable hydrogen gas. Strong acids, strong bases, strong oxidizers. Mineral acids. *When molten:* water. *For particulates and dust:* Water.

7.3. Specific End Use(s)

No use is specified.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), or OSHA (PEL).

Aluminum (7429-90-5)		
USA ACGIH	ACGIH OEL TWA	1 mg/m ³ (respirable particulate matter)
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA NIOSH	NIOSH REL (TWA)	10 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)

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USA OSHA	OSHA PEL (TWA) [1]	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)
Silicon (7440-21-3)		
USA NIOSH	NIOSH REL (TWA)	10 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)
USA OSHA	OSHA PEL (TWA) [1]	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)
Copper (7440-50-8)		
USA ACGIH	ACGIH OEL TWA	0.2 mg/m ³ (fume)
USA NIOSH	NIOSH REL (TWA)	1 mg/m ³ (dust and mist) 0.1 mg/m ³ (fume)
USA IDLH	IDLH	100 mg/m ³ (dust, fume and mist)
USA OSHA	OSHA PEL (TWA) [1]	0.1 mg/m ³ (fume) 1 mg/m ³ (dust and mist)
Cobalt (7440-48-4)		
USA ACGIH	ACGIH OEL TWA	0.02 mg/m ³ (inhalable particulate matter)
USA ACGIH	ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans, dermal sensitizer
USA ACGIH	BEI (BLV)	15 µg/l Parameter: Cobalt - Medium: urine - Sampling time: end of shift at end of workweek (nonspecific)
USA NIOSH	NIOSH REL (TWA)	0.05 mg/m ³ (dust and fume)
USA IDLH	IDLH	20 mg/m ³ (dust and fume)
USA OSHA	OSHA PEL (TWA) [1]	0.1 mg/m ³ (dust and fume)
Zinc oxide (ZnO) (1314-13-2)		
USA ACGIH	ACGIH OEL TWA	2 mg/m ³ (respirable particulate matter)
USA ACGIH	ACGIH OEL STEL	10 mg/m ³ (respirable particulate matter)
USA NIOSH	NIOSH REL (TWA)	5 mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (STEL)	10 mg/m ³ (fume)
USA NIOSH	NIOSH REL (Ceiling)	15 mg/m ³ (dust)
USA IDLH	IDLH	500 mg/m ³
USA OSHA	OSHA PEL (TWA) [1]	5 mg/m ³ (fume) 15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)
Tin (7440-31-5)		
USA ACGIH	ACGIH OEL TWA	2 mg/m ³ (inhalable particulate matter)
USA NIOSH	NIOSH REL (TWA)	2 mg/m ³
USA IDLH	IDLH	100 mg/m ³
Manganese (7439-96-5)		
USA ACGIH	ACGIH OEL TWA	0.02 mg/m ³ (respirable particulate matter) 0.1 mg/m ³ (inhalable particulate matter)
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA NIOSH	NIOSH REL (TWA)	1 mg/m ³ (fume)
USA NIOSH	NIOSH REL (STEL)	3 mg/m ³
USA IDLH	IDLH	500 mg/m ³
USA OSHA	OSHA PEL (Ceiling)	5 mg/m ³ (fume)
Lead (7439-92-1)		
USA ACGIH	ACGIH OEL TWA	0.05 mg/m ³
USA ACGIH	ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
USA ACGIH	BEI (BLV)	200 µg/l Parameter: Lead - Medium: blood - Sampling time: not critical (Note: Persons applying this BEI are encouraged to counsel female workers of child-bearing age about the risk of delivering a child with a PbB (lead in blood level) over the current CDC reference value.)
USA NIOSH	NIOSH REL (TWA)	0.05 mg/m ³

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USA IDLH	IDLH	100 mg/m ³
USA OSHA	OSHA PEL (TWA) [1]	50 µg/m ³
USA OSHA	OSHA Action Level/Excursion Limit	30 µg/m ³ (Action Level, see 29 CFR 1910.1025)
Nickel (7440-02-0)		
USA ACGIH	ACGIH OEL TWA	1.5 mg/m ³ (inhalable particulate matter)
USA ACGIH	ACGIH chemical category	Not Suspected as a Human Carcinogen
USA ACGIH	BEI (BLV)	5 µg/l Parameter: Nickel - Medium: urine - Sampling time: post-shift at end of workweek (background)
USA NIOSH	NIOSH REL (TWA)	0.015 mg/m ³
USA IDLH	IDLH	10 mg/m ³
USA OSHA	OSHA PEL (TWA) [1]	1 mg/m ³
Silver (7440-22-4)		
USA ACGIH	ACGIH OEL TWA	0.1 mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (TWA)	0.01 mg/m ³ (dust) 0.9 µg/m ³ (nanoparticles <100 nm)
USA IDLH	IDLH	10 mg/m ³ (dust)
USA OSHA	OSHA PEL (TWA) [1]	0.01 mg/m ³

8.2. Exposure Controls

Appropriate Engineering Controls

: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Avoid dust production. Avoid creating or spreading dust. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e, there is no leakage from the equipment). Suitable eye/body wash equipment should be available in the vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Proper grounding procedures to avoid static electricity should be followed. Gas detectors should be used when toxic gases may be released. Use explosion-proof equipment. Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits. Power equipment should be equipped with proper dust collection devices. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment.

Personal Protective Equipment

: Safety glasses. Insufficient ventilation: wear respiratory protection. Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing

: With molten material wear thermally protective clothing. Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection

: Wear chemically resistant protective gloves. If material is hot, wear thermally resistant protective gloves. Wear protective gloves. When needed, wear protective gloves to protect against thermal and/or mechanical hazards.

Eye and Face Protection

: Chemical goggles or face shield.

Skin and Body Protection

: Wear suitable protective clothing.

Respiratory Protection

: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits. If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Thermal Hazard Protection

: If material is hot, wear thermally resistant protective gloves.

Environmental Exposure Controls

: Do not allow the product to be released into the environment.

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Consumer Exposure Controls : Do not eat, drink or smoke during use. Avoid contact during pregnancy/while nursing.

Other Information : When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Metallic.
Odor	: Odorless.
Odor Threshold	: Not applicable
pH	: No data available
Evaporation Rate	: No data available
Melting Point	: 440 – 1215 °F (226.67 – 657.22 °C)
Freezing Point	: No data available
Boiling Point	: No data available
Flash Point	: Not applicable
Auto-ignition Temperature	: No data available
Decomposition Temperature	: No data available
Flammability (solid, gas)	: Flammable solid (Dust, fines, chips)
Vapor Pressure	: No data available
Relative Vapor Density at 20°C	: No data available
Relative Density	: No data available
Specific Gravity	: 2.5 - 2.9 (Water = 1)
Solubility	: Water: Insoluble
Partition Coefficient: N-Octanol/Water	: No data available
Viscosity	: No data available

9.2. Other Information

No additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

As shipped: Stable under normal storage conditions. Dust and other forms of product formed from processing might react with water producing a flammable/explosive environment, especially in confined spaces. Molten material will react violently with water. Reacts readily with water liberating highly flammable gases. Reacts violently with strong oxidizers. Increased risk of fire or explosion.

10.2. Chemical Stability

Stable under recommended handling and storage conditions (see section 7). Flammable solid. Metallic dusts may ignite or explode.

10.3. Possibility of Hazardous Reactions

In contact with water releases flammable gas.

10.4. Conditions to Avoid

Moisture. Direct sunlight, extremely high or low temperatures, heat, hot surfaces, sparks, open flames, incompatible materials, and other ignition sources. Water. Dust accumulation (to minimize explosion hazard). Dust, chips, or ribbons can be ignited more easily, by an ignition source, by improper machining, or by spontaneous combustion if finely divided and damp.

10.5. Incompatible Materials

Corrosive substances in contact with metals may produce flammable hydrogen gas. Strong acids, strong bases, strong oxidizers. Mineral acids. *When molten*: water. *For particulates and dust*: Water.

10.6. Hazardous Decomposition Products

None expected under normal conditions of use. Thermal decomposition may produce: Metal oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects

Acute Toxicity (Oral): Not classified

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Fatal if inhaled.

Aluminum Alloys	
ATE (Dust/Mist)	0.05 mg/l/4h
Aluminum (7429-90-5)	

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LD50 Oral Rat	> 15900 mg/kg
Silicon (7440-21-3)	
LD50 Oral Rat	3160 mg/kg
Copper (7440-50-8)	
LC50 Inhalation Rat	> 5.11 mg/l/4h
Cobalt (7440-48-4)	
LD50 Oral Rat	550 mg/kg (Species: Sprague Dawley)
LC50 Inhalation Rat	< 0.05 mg/l/4h
ATE (Dust/Mist)	0.01 mg/l/4h
Zinc oxide (ZnO) (1314-13-2)	
LD50 Oral Rat	> 5000 mg/kg
LD50 Dermal Rat	> 2000 mg/kg (no deaths)
LC50 Inhalation Rat	> 5700 mg/m ³ (Exposure time: 4 h)
Tin (7440-31-5)	
LD50 Dermal Rat	> 2000 mg/kg
Manganese (7439-96-5)	
LD50 Oral Rat	> 2000 mg/kg
LC50 Inhalation Rat	> 5.14 mg/l/4h
Nickel (7440-02-0)	
LD50 Oral Rat	> 9000 mg/kg
LC50 Inhalation Rat	> 10.2 mg/l (Exposure time: 1 h)
Silver (7440-22-4)	
LD50 Oral Rat	> 5000 mg/kg
LD50 Dermal Rat	> 2000 mg/kg
LC50 Inhalation Rat	> 5.16 mg/l/4h

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: May cause an allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.

Germ Cell Mutagenicity: Suspected of causing genetic defects.

Carcinogenicity: May cause cancer.

Cobalt (7440-48-4)	
IARC group	2B
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen, Evidence of Carcinogenicity.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Lead (7439-92-1)	
IARC group	2A
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Nickel (7440-02-0)	
IARC group	2B
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Reproductive Toxicity: May cause harm to breast-fed children. (This material or its emissions may appear in breast milk of nursing mothers.)

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Causes damage to organs through prolonged or repeated exposure.

Aspiration Hazard: Not classified

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Symptoms/Injuries After Inhalation: During processing, the most significant route of exposure is by the inhalation (breathing) of fumes. If fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza; Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Exposure may produce cough, mucous secretions, shortness of breath, chest tightness or other symptoms indicative of an allergic/sensitization reaction. Inhalation of this material can cause serious health effects in small amounts, leading to unconsciousness and death. Dust may be harmful or cause irritation. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

Symptoms/Injuries After Skin Contact: Direct contact may cause irritation by mechanical abrasion. Contact with hot, molten metal will cause thermal burns. May cause an allergic skin reaction. Contact with fumes or metal powder will irritate skin. Contact with hot, molten metal will cause thermal burns.

Symptoms/Injuries After Eye Contact: During metal processing, dusts caused from physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes. Risk of thermal burns on contact with molten product.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: In massive form, no chronic hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material: May cause cancer. May cause harm to breast-fed children. Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis. Silicon: Can cause chronic bronchitis and narrowing of the airways. Copper: Overexposure to fumes may cause metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude); metallic or sweet taste; discoloration of skin and hair. Tissue damage of mucous membranes may follow chronic dust exposure. Cobalt: Chronic exposure to cobalt-containing hard metal (dust or fume) can result in a serious lung disease called "hard metal lung disease", which is a type of pneumoconiosis (lung fibrosis). Zinc: Prolonged exposure to high concentrations of zinc fumes may cause "zinc shakes", an involuntary twitching of the muscles. Otherwise, zinc is non-toxic. Tin: Has been shown to increase incidence of sarcoma in animal tests. Chronic exposure to tin dusts and fume may result in "stannosis", a mild form of pneumoconiosis. Manganese: Chronic exposure can cause inflammation of the lung tissue, scarring the lungs (pulmonary fibrosis). Chronic exposure to excessive manganese levels can lead to a variety of psychiatric and motor disturbances, termed manganism. Lead: Exposure can result in lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; encephalopathy; kidney disease; hypertension. Inhalation of Nickel compounds has been shown in studies to provide an increased incidence of cancer of the nasal cavity, lung and possibly larynx in nickel refinery workers. Silver: Chronic skin contact or ingestion of silver dust, salts or fume can result in a condition known as Argyria, a condition with bluish pigmentation of the skin and eyes. Skin sensitization. Causes damage to organs through prolonged or repeated exposure. Suspected of causing genetic defects. Overexposure to metal fumes may result metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude), disturbances in smell and/or taste, and possible discoloration of skin, hair and mucous membranes; discoloration may become permanent.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General

: Very toxic to aquatic life with long lasting effects.

Copper (7440-50-8)	
LC50 Fish 1	0.0068 – 0.0156 mg/l (Exposure time: 96 h - Species: Pimephales promelas)
EC50 - Crustacea [1]	0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 Other Aquatic Organisms 1	0.0426 (0.0426 – 0.0535) mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata [static])
LC50 Fish 2	< 0.3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Other Aquatic Organisms 2	0.031 (0.031 – 0.054) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])
Cobalt (7440-48-4)	
LC50 Fish 1	> 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
Zinc oxide (ZnO) (1314-13-2)	
LC50 Fish 1	1.793 mg/l (Exposure time: 96 h - Species: Zebrafish)
EC50 - Crustacea [1]	0.154 mg/l (Desmodesmus subspicatus 48 h)
ErC50 (Algae)	3.35 mg/l (Desmodesmus subspicatus 72 h)
NOEC Chronic Fish	0.026 mg/l (Jordanelia floridae)
NOEC Chronic Crustacea	0.04 mg/l (Daphnia magna 21 d semi-static reproduction)

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Manganese (7439-96-5)	
LC50 Fish 1	> 3.6 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static])
NOEC Chronic Fish	3.6 mg/l (Exposure time: 96h; Species: Oncorhynchus mykiss)
Lead (7439-92-1)	
LC50 Fish 1	0.44 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 - Crustacea [1]	600 µg/l (Exposure time: 48 h - Species: water flea)
LC50 Fish 2	1.17 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
Nickel (7440-02-0)	
LC50 Fish 1	100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio)
EC50 - Crustacea [1]	121.6 µg/l (Exposure time: 48h - Species: Ceriodaphnia dubia [static])
LC50 Fish 2	15.3 mg/l
EC50 - Crustacea [2]	1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 Other Aquatic Organisms 2	0.174 (0.174 – 0.311) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])
Silver (7440-22-4)	
LC50 Fish 1	0.00155 (0.00155 – 0.00293) mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 - Crustacea [1]	0.00024 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 Fish 2	0.0062 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])

12.2. Persistence and Degradability

Aluminum Alloys	
Persistence and Degradability	May cause long-term adverse effects in the environment. Inorganic product which cannot be eliminated from water by biological purification processes.
Copper (7440-50-8)	
Persistence and Degradability	Not readily biodegradable.

12.3. Bioaccumulative Potential

Aluminum Alloys	
Bioaccumulative Potential	Bioaccumulation of metals cannot be excluded. Not established.
Cobalt (7440-48-4)	
BCF Fish 1	(no bioaccumulation)

12.4. Mobility in Soil

Aluminum Alloys	
Ecology - Soil	Adsorption to solid soil phase is not expected.

12.5. Other Adverse Effects

Other Adverse Effects	: None known.
Other Information	: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Methods

Waste Treatment Methods: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Sewage Disposal Recommendations: Do not dispose of waste into sewer. Do not empty into drains.

Waste Disposal Recommendations: Dispose of contents/container in accordance with local, regional, national, and international regulations.

Additional Information: Recycle the material as far as possible. Handle empty containers with care because residual product is flammable. Recover or recycle if possible.

Ecology - Waste Materials: Avoid unnecessary release into the environment. Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

14.1. In Accordance with DOT

Marine Pollutant : Marine pollutant

14.2. In Accordance with IMDG

Marine Pollutant : Marine pollutant

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14.3. In Accordance with IATA

Not regulated for transport

*The shipping descriptions above do not apply to forms of this product that may result from further processing (such as dust, fines, and chips). Shipping classifications must be reassessed if the form of the product is altered.

SECTION 15: REGULATORY INFORMATION

15.1. US Federal Regulations

Aluminum Alloys	
SARA Section 311/312 Hazard Classes	Health hazard - Carcinogenicity Health hazard - Specific target organ toxicity (single or repeated exposure) Health hazard - Respiratory or skin sensitization Physical hazard - In contact with water emits flammable gas Physical hazard - Flammable (gases, aerosols, liquids, or solids) Health hazard - Germ cell mutagenicity Health hazard - Reproductive toxicity Health hazard - Acute toxicity (any route of exposure) Physical hazard - Combustible dust
Aluminum (7429-90-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	1 % (dust or fume only)
Silicon (7440-21-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active	
Copper (7440-50-8)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	5000 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm
SARA Section 313 - Emission Reporting	1 %
Cobalt (7440-48-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	0.1 %
Zinc oxide (ZnO) (1314-13-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active	
Tin (7440-31-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active	
Manganese (7439-96-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	1 %
Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	10 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm
SARA Section 313 - Emission Reporting	0.1 %
Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are < 100 µm)
SARA Section 313 - Emission Reporting	0.1 %

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Silver (7440-22-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	1000 lb < 100 um CERCLA/SARA RQ CHANGE TITLE
SARA Section 313 - Emission Reporting	1 %

15.2. US State Regulations

Aluminum (7429-90-5) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Silicon (7440-21-3) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List
Copper (7440-50-8) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Cobalt (7440-48-4) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Zinc oxide (ZnO) (1314-13-2) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Tin (7440-31-5) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List
Manganese (7439-96-5) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Lead (7439-92-1) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Nickel (7440-02-0) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Silver (7440-22-4) U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

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U.S. - Massachusetts - Right To Know List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

California Proposition 65



WARNING: This product can expose you to Lead, 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.

Chemical Name (CAS No.)	Carcinogenicity	Developmental Toxicity	Female Reproductive Toxicity	Male Reproductive Toxicity
Cobalt (7440-48-4)	X			
Lead (7439-92-1)	X	X	X	X
Nickel (7440-02-0)	X			

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest Revision

: 08/30/2023

Other Information

: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200. This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

H228	Flammable solid
H261	In contact with water releases flammable gas
H302	Harmful if swallowed
H317	May cause an allergic skin reaction
H330	Fatal if inhaled
H334	May cause an allergy or asthma symptoms or breathing difficulties if inhaled
H341	Suspected of causing genetic defects
H350	May cause cancer
H351	Suspected of causing cancer
H360	May damage fertility or the unborn child
H362	May cause harm to breast-fed children
H372	Causes damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H401	Toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom)