

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Product form : Stainless Steel

Product name : Stainless Steel Wire for Archwires, Bond-A-Braid, Kobayashi, TNT Archwires, and Stainless Steel OrthoFlexTech

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Use of the substance/mixture : For professional use only.

**1.3. Details of the supplier of the safety data sheet****Manufacturer:**

Reliance Orthodontic Products Inc.

1540 West Thorndale Ave.

Itasca, IL 60143 USA

630-773-4009, during normal business hours

**1.4. Emergency telephone number**

CHEMTREC - 24-Hour Hazmat Emergency Communications Center : Domestic: 1-800-424-9300

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification (GHS-US)**

Non-hazardous in solid, bulk form

**GHS Classification:**

Stainless Steel is generally not considered hazardous to the Globally Harmonized System (GHS) and is not considered hazardous according to the OSHA Hazard Communication Standard 2012 (29 CFR 1910.120) in the form (solid) shipped (solid bars, billets wire, etc.), however, if your process involves grinding, melting, welding, cutting, sawing, brazing, buffing, polishing, or other similar heat-generating processes, or any other process that causes a release of dust or fume, hazardous levels of dust or fume of the constituents of these alloys could be generated. The powders, fumes and/or ions can present hazards such as acute and chronic toxicity, flammability, pyrophoricity, self-heating capabilities, carcinogenicity, and water reactivity.

For potential hazards of individual constituents see section(s) 3, 10, 11 and 12.

Full text of H-phrases: see section 16

**2.2. Label elements****GHS-US labeling**

Hazard pictograms (GHS-US) and precautionary statements:



GHS02



GHS07



GHS08



GHS09

**Hazard statements (GHS-US)**

Short Term exposure to fumes/dust generated from stainless steel use and processing may produce irritation of the eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of iron, manganese and copper may cause metal fume fever, characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly have a synergistic effect and increase the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chromium and nickel and their compounds are listed in the National Toxicology Program's (NTP) 7th Annual Report on Carcinogens. Exposure to dust and fumes can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract, and cancer of nasal passages and lungs.

NTP classifies nickel metal and certain nickel compounds as "reasonably anticipated to be carcinogens." IARC classifies nickel metal as a possible human carcinogen (Group 2B) and certain nickel compounds as known human carcinogens (Group 1).

NTP reports that there is inadequate evidence for the carcinogenicity of chromium metal and most trivalent chromium (CrIII) compounds in humans and experimental animals. However, NTP classifies certain hexavalent chromium compounds as "known to be carcinogens." Similarly, IARC indicates that chromium metal and trivalent chromium compounds are not classifiable as human carcinogens (Group 3), but that certain hexavalent chromium compounds are known carcinogens (Group 1). Since the hexavalent form of chromium may be produced during welding, heat-treating and alkaline descaling processes, an industrial hygiene evaluation of such process should be conducted to determine if exposure to hexavalent chromium is present.

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### Precautionary statements (GHS-US)

Bulk, solid material is non-hazardous  
For dust or fine turnings:  
Obtain special instructions before use, P201  
Do not handle until all safety precautions have been read and understood, P202  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking, P210  
Do not allow contact with water, P223  
Use only non-sparking tools, P242  
Take precautionary measures against static discharge, P243  
Do not breathe dust/fume/gas/mist/vapours/ spray, P260  
Avoid breathing dust/fume/gas/mist/vapors/spray, P261  
Wash contaminated clothing before reuse, P363  
Wash contacted skin thoroughly after handling, P264  
Do not eat, drink or smoke when using this product, P270  
Use only outdoors or in a well-ventilated area – if releasing dust fumes or particulate, P271  
Contaminated work clothing should not be allowed out of the workplace, P272  
Wear protective gloves/protective clothing/eye protection/face protection, P280  
Use only outdoors or in a well-ventilated area, P284  
Get medical advice/attention if you feel unwell, P314  
Brush off loose particulate from clothing, P335  
Eliminate all ignition sources if safe to do so, P381  
If experiencing respiratory symptoms, call a poison center or physician, P342+P311  
In case of fire: Use dry sane, dry chemical, CO2 or Class D Extinguisher, P370+P378  
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P301+P330+P331  
IF IN EYES: Rinse with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P305+P351+P338  
IF INHALED: Remove person to fresh air and keep comfortable for breathing. P304+P340

STORE: Away from incompatible materials described in "Section 10" in accordance with federal/provincial/state or local regulations, P401  
Store in a dry place, P402  
Store in a closed container, P404  
Dispose of contents/container in accordance with local/regional/ national/international regulations, P501  
Refer to manufacturer/supplier for information on recovery/recycling, P502

### Hazards not otherwise classified

Dust or fine turnings may be irritating to mucous membranes, respiratory tract or eyes upon contact.

### 2.3. Other hazards

Hazardous Materials Identification System (HMIS ratings (scale 0-4))

Health (acute effects) = 1

Flammability = 3

Physical Hazard = 1

### 2.4. Unknown acute toxicity (GHS-US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Chemical Name	CAS No.	Weight-%
Aluminum, Al	7429-90-5	0-1
Carbon, C	7440-44-0	trace
Chromium, Cr	7440-47-3	10.5-30

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Cobalt, Co	7440-48-4	0 - 1
Copper, Cu	7440-50-8	0 – 5
Iron, Fe	7439-89-6	None
Lead, Pb	7439-92-1	trace
Manganese, Mn	7439-96-5	0-15
Manganese, Mn	7439-96-5	0-15
Molybdenum, Mb	7439-98-7	0-5
Nickel, Ni	7440-02-0	0-40
Nitrogen, N	7727-37-9	trace
Oxygen, O	7782-44-7	trace
Phosphorus, P	7723-14-0	trace
Selenium, Se	7782-49-2	0-2
Silicon, Si	7440-21-3	0-3
Sulfur, S	7704-34-9	trace
Tantalum, Ta	7440-25-7	trace
Titanium, Ti	7440-32-6	0-1
Tungsten, W	7440-33-7	trace
Vanadium, V	7440-62-2	trace

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

inhalation	: If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
skin contact	: If irritation develops, wash skin thoroughly with soap and water. In the case of skin irritation or allergic reactions see a physician.
eye contact	: Dust may cause irritation. In the case of eye contact, flush with large amounts of water for at least 15 minutes and seek immediate medical attention.
ingestion	: If significant amounts of dust are ingested consult a physician. Do not induce vomiting.

#### 4.2. Most important symptoms and effects, both acute and delayed

Can cause allergic skin reactions. Can cause gastrointestinal effects if swallowed. During processing (cutting, milling, grinding, melting, or welding), emitted byproducts can cause irritations, difficulty in breathing, coughing, or wheezing.

#### 4.3. Indication of any immediate medical attention and special treatment needed

Note to physicians: Treat symptomatically.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Not flammable in the product form as distributed, but processing can create dust and/or finely divided particles that are flammable.

Suitable extinguishing media	: Use dry sane, dry chemical, CO2 or Class D Extinguisher.
Unsuitable extinguishing media	: Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.
Hazardous Combustion Products	: Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided alloy. Particle size and dispersion in air determine reactivity.

#### 5.2. Special hazards arising from the substance or mixture

Intense heat. Very fine, high surface area material resulting from grinding, buffing polishing, or similar processes of this product may ignite spontaneously at room temperature and/or form combustible dust-air mixtures. Keep particles away from all ignition sources; including heat, sparks, and flames. Prevent dust accumulations to minimize combustible dust hazard.

#### 5.3. Advice for firefighters

Firefighters should wear self-contained MSHA/NIOSH-approved (or equivalent) breathing apparatus and full protective gear.

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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### 6.1.1. For non-emergency personnel

Protective Equipment : Use appropriate personal protective equipment based on site conditions.  
 Emergency procedures : Avoid breathing dust or fumes. Use adequate ventilation. Remove all ignition sources if dust is present. Note that dust and fine shavings may be flammable.

##### 6.1.2. For emergency responders

Protective equipment : Use appropriate personal protective equipment based on site conditions.  
 Emergency procedures : Control ignition sources and use non-sparking tools when handling dust or finely ground turnings which may be flammable.

#### 6.2. Environmental precautions

Prevent entry of material into soil, waterways, drains and sewers. Prevent exposure of material to weather (snow, rain) to avoid leaching dissolved metals and/or residuals into the environment

#### 6.3. Methods and material for containment and cleaning up

Collect by vacuuming, by sweeping or by wet mopping to prevent spreading of dust. Avoid inhalation of dusts. Do not allow entry to sewers.

#### 6.4. Reference to other sections

See Section 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Precautions for safe handling : Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Wash and rinse after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse; particularly after processing.

#### 7.2. Conditions for safe storage, including any incompatibilities

Conditions for Safe Storage : Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Prevent dust accumulations to minimize combustible dust hazard.

Incompatibilities : See Section 10.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

Chemical	CAS Number	OSHA PEL 8hr TWA (mg/m3)	NIOSH (mg/m3)		ACGIH TLV 8hr TWA (mg/m3)
			REL 8hr TWA	IDLH	
Aluminum, Al	7429-90-5	-	Dust=10	-	Dust=10
			Resp.=5 Fume=5 Soluble Salt=2		Fume=5 Soluble Salt=2
Aluminum Oxide, Al <sub>2</sub> O <sub>3</sub>	1344-28-1	Total=15 Respirable=5	-	-	-
Carbon, C	7440-44-0	Total=15 Respirable=5	-	-	-
Chromium, Cr	7440-47-3	Cr Metal=1 Insoluble Cr salts=1 Cr+2 compounds=0.5, Cr+3 compounds=0.5, Cr+6 comp. =0.005	0.5	Cr+2=250 Cr =250 Cr+3 =25	Cr Metal = 0.5 Cr+3 =0.5 Soluble Cr+6

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		Cr+6 action level=0.0025			=0.05 Insol. Cr+6 =0.01
Chromium (hexavalent), Cr+6	various	Cr Metal=1 Insoluble Cr salts=1 Cr+2 compounds=0.5, Cr+3 compounds=0.5, Cr+6 comp. =0.005 Cr+6 action level=0.0025	0.5	Cr+2=250 Cr =250 Cr+3 =25	Cr Metal = 0.5 Cr+3 =0.5 Soluble Cr+6 =0.05 Insol. Cr+6 =0.01
Cobalt, Co	7440-48-4	Metal/Dust/Fume=0.1 (proposed=0.05)	0.05	20	0.05
Copper, Cu	7440-50-8	Fume=0.1 as Cu Dust & mists=1 as Cu	1	100	Fume=0.2 Dust & mist=0.2
Iron, Fe	7439-89-6	-	Fe salts=1	-	-
Lead, Pb	7439-92-1	0.050	0.0500	100 (Effective =400)	0.15
Lead Oxide, PbO	1317-36-8	0.050 (as Pb)	0.050 (as Pb)		
Lithium, Li	7439-93-2	0.025	0.025	0.5	-
Magnesium, Mg	7439-95-4	-	-	-	-
Magnesium Oxide, MgO	1309-48-4	Total Dust=15	-	750	10
Manganese, Mn	7439-96-5	Ceiling=5 (proposed)	1 (ST=3)	500	0.2 as Mn
Manganese Dioxide, MnO2	1313-13-9	Ceiling=5 (proposed)	1 (ST=3)	500	0.2 as Mn
Molybdenum, Mo	7439-98-7	Soluble = 5 Insoluble=15	10	5000 (Soluble comp=1000)	Inhalable=10 Respirable=3 Soluble=5 Insoluble=10
Nickel, Ni & Ni inorganic compounds	7440-02-0	Metal & Insoluble = 1 Soluble=0.1(proposed)	0.015	10	Metal=1.5 Soluble=0.1 Insoluble=0.2
Nitrogen, N	93037-13-9	-	-	-	-
Oxygen, O	7782-44-7	-	-	-	-
Phosphorus, P4	7723-14-0 231-768-7	0.1	0.1	5	0.1
Phosphorus Pentoxide, P4O10	1314-56-3 215-236-1	-	-	-	-
Selenium, Se	7782-49-2	0.2	0.2	1	
Selenium Dioxide, SeO2	7446-08-4	0.2 MAK(inhal.fract)=0.05	0.2	-	0.2
Silicon, Si	7440-21-3	Total Dust=15 Respirable dust=5	Dust: Total=10	-	Total Dust=10

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Silicon Dioxide, SiO <sub>2</sub>	14808-60-7	-	-	-	-
Sulfur, S	7704-34-9	-	-	-	-
Sulfur Dioxide, SO <sub>2</sub>	7446-09-5	13	5 (ST=13)	100	5 (ST=13)
Tantalum, Ta	7440-25-7	5	5 (ST=10)	2500	5
Titanium, Ti	7440-32-6	-	-	-	-
Titanium Dioxide, TiO <sub>2</sub>	13463-67-7	15	-	5000	10
Tungsten, W	7440-33-7	-	5 (ST=10)	-	-
Vanadium, V	7440-62-2	V <sub>2</sub> O <sub>5</sub> only=0.5 (Respirable)	compounds only=0.05	comp=35 as V	
Vanadium Oxide, V <sub>2</sub> O <sub>5</sub>	1314-62-1	Respirable=0.5	0.05	35 as V	Respirable 0.05 as V <sub>2</sub> O <sub>5</sub>

### 8.2. Exposure controls

#### 8.2.1 Appropriate Engineering Controls

: Provide local exhaust when cutting, grinding, or heating. Use good industrial hygiene practices. Keep dust and fume buildup to a minimum and avoid generation of uncontrolled particles. Avoid static discharge where dust or turnings are generated. Local and or general exhaust ventilation should be used to keep worker exposure below applicable exposure limits during welding, burning, grinding, melting, sawing, brazing, buffing, polishing, or other similar heat-generating processes which may generate airborne contaminants. Prevent accumulation of small particulate that might ignite. Collect chips and grinds for recycling where feasible.

#### - Exposure Guidelines:

Follow all applicable exposure limits. Keep formation of airborne particulate and fumes to a minimum. Exposure controls and personal protection can vary depending on process and/or application.

#### 8.2.2 Personal Protective Equipment:

Processes performed on material should be evaluated (risk assessment) to establish need for suitable equipment to protect worker from exposure to hazards above stated limits.

#### Pictograms for Personal Protective Equipment:



#### - Respiratory Protection

: Use NIOSH/MSHA approved respirators when particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

#### - Skin and body Protection

: Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present. For example, fire resistant clothing may be appropriate during hot work with product. Cut resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present. Chemical-resistant, impervious gloves may be appropriate if material is wet.

#### - Eye/face Protection

: When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

#### - General Hygiene Considerations

: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

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### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Color	: metallic, gray or silver
Appearance	: Various forms (wire, billet, rod, cores, ingot, etc.)
Odor	: No odor/orderless
Solubility in water	: Not water soluble
pH	: No data available
Melting point	: Not available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Decomposition temperature	: Not applicable
Evaporation rate	: Not applicable
Vapor Density	: Not applicable
Vapor pressure	: Not applicable
Density (with various composition)	: Not applicable
Percent Volatile Organic Compound	: None

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Not applicable.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

None under normal processing. Hazardous polymerization does not occur.

#### 10.4. Conditions to avoid

Dust formation and dust accumulation.

#### 10.5. Incompatible materials

May react with acids like hydrofluoric acid and oxidizers. Reaction will vary with specific alloy composition when in the presence of chlorine, bromine, halocarbons, carbon tetrachloride, and Freon when heated above 200-deg.

#### 10.6. Hazardous decomposition products

Reacts with mineral acid, inorganic acids and oxidizers to form hydrogen gas (flammable) and to form dissolved metal ions that are to be prohibited from waterways. Melting and/or burning can produce toxic metal fumes. See "Section 3 Composition/ Information on Ingredients", and "Section 8 Exposure Controls/ Personal Protection", and "Section 11 Toxicological Information" for additional information.

#### 10.7. Hazardous Polymerization

Will not occur.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Inhalation : Not an expected route of exposure for product in massive form.

Eye contact : High concentration of dust may cause irritation to the eyes.

Skin contact : Prolonged skin contact with dust may cause skin irritation to sensitive individuals.

Inhalation : Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding, machining, melting, sawing, brazing, buffing, polishing, or sweeping may pose acute or chronic health effects.

Ingestion : Ingestion of metal particulate may cause acute gastrointestinal effects.

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### LETHAL DOSE TOXICITY BY INDIVIDUAL COMPONENT

(Oral & Inhalation tests prefer rat. Dermal test prefer rat or rabbit.)

Chemical	CAS Number	LD50 Oral (mg/Kg bw)	LD50 Dermal (mg/Kg bw)	LC50 Inhalation (mg/l)
Aluminum, Al	7429-90-5	-	-	-
Aluminum Oxide, Al <sub>2</sub> O <sub>3</sub>	1344-28-1	>5000 (rat) (OECD Guideline 401)	-	>2.3 (4h) (OECD Guideline 403)
Carbon, C	7440-44-0	-	-	-
Chromium, Cr	7440-47-3	-	-	-
Chromium (hexavalent), Cr+6	various	Potassium dichromate=25 (rat)	Potassium dichromate=14 (rabbit)	-
Cobalt, Co	7440-48-4	6170 (rat)	-	>10 (rat@1h)
Copper, Cu	7440-50-8	481	> 2000	> 5.11
Iron, Fe	7439-89-6	98,600	-	> 0.25
Iron Oxide, Fe <sub>2</sub> O <sub>3</sub>	1309-37-1	Ferric oxide black=10000 (rat)	-	-
Lead, Pb	7439-92-1	Lowest Lethal Dose (human)=450		
Lead Oxide, PbO	1317-36-8			
Manganese, Mn	7439-96-5	-	-	-
Manganese Dioxide, MnO <sub>2</sub>	1313-13-9	9,000 (rat)	-	-
Molybdenum, Mo	7439-98-7	-	-	-
Nickel & compounds (inorganic Ni)	7440-02-0	Both values found > 9000 (rat) or 105 (rat)	-	-
Nitrogen, N	7727-37-9	-	-	-
Oxygen, O	7782-44-7	-	-	-
Phosphorus, P	7723-14-0	3.03 (rat)	4.3 (rat@1hr)	100 (rat)
Phosphorus Pentoxide, P <sub>4</sub> O <sub>10</sub>	16752-60-6	-	-	1217 (rat@1h)
Selenium	7782-49-2	6700 (rat)	-	-
Selenium Dioxide, SeO <sub>2</sub>	7446-08-4	48 and 68.1	4	Not listed
Silicon, Si	7440-21-3	3160 (rat)	-	-
Silicon Dioxide, SiO <sub>2</sub>	14808-60-7	-	-	-
Sulfur, S	7704-34-9	> 3000 (rat)	> 2000 (rabbit)	> 9.23 (rat@4hr)
Sulfur Dioxide, SO <sub>2</sub>	7446-09-5	-	-	1260 ppm(rat@4hr)
Tantalum, Ta	7440-25-7	-	-	-
Titanium, Ti	7440-32-6	> 5000	-	-
Titanium Dioxide, TiO <sub>2</sub>	13463-67-7	>10,000 (rat)	> 10000 (rabbit)	> 6.8 (rat@4hr)
Tungsten, W	7440-33-7	-	-	-
Vanadium, V	7440-62-2	> 2000	-	-
Vanadium Oxide, V <sub>2</sub> O <sub>5</sub>	1314-62-1	-	-	-



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HAZARD INFORMATION (Carcinogen, Specific Target Organ Toxicity - Repeat & Single Exposure, Reproductive Toxicity, Germ Cell Mutagenic, Skin Sensitizer, etc.)

Chemical	Carcinogenicity			
	ACGIH	IARC	NIOSH	NTP
Aluminum, Al	-	-	-	-
Aluminum Oxide,	-	-	-	-
Carbon, C	-	-	-	-
Chromium, Cr	-	Metal & Cr <sup>+3</sup> =3	-	-
Chromium (Hexavalent), Cr <sup>+6</sup>	A1	1	Yes	K
Cobalt, Co	Metal & Compounds= A3	(Co metal w/tungsten carbide=2A) (Alloys, Compounds, Metal, & hydroxides=2B)	-	Alloys=K
Copper, Cu	-	-	-	-
Iron, Fe	-	-	-	-
Iron Oxide, Fe2O3	-	-	-	-
Lead, Pb	Lead & Inorganic lead compounds=A3	Lead & Inorganic lead compounds=2B	-	-
Lead Oxide, PbO	A3	2A	-	R
Manganese, Mn	-	-	-	-
Manganese Dioxide, MnO2	-	-	-	-
Molybdenum, Mo	-	-	-	-
Nickel, Ni	Insoluble compounds, as Ni = A1	Metal & Alloys =2B Compounds= 1	Metallic, Soluble, Insoluble, Inorganic =Yes	Metal, Alloys, Compounds, & Hydroxides=R
Nitrogen, N	-	-	-	-
Oxygen, O	-	-	-	-
Phosphorus, P	-	-	-	-
Phosphorus Pentoxide, P4O10	-	-	-	-
Selenium, Se	-	3B	-	Selenium sulfide=R
Selenium Dioxide,	-	3B	-	-
Silicon, Si	-	-	-	-
Silicon Dioxide, SiO2	-	-	-	-
Sulfur, S	-	-	-	-
Sulfur Dioxide, SO2	-	3	-	-
Tantalum, Ta	-	-	-	-
Titanium, Ti	-	-	-	-
Titanium Dioxide, TiO2	A4	2B	Yes	-
Tungsten, W	-	-	-	-
Vanadium, V	-	-	-	-

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Vanadium Oxide, V <sub>2</sub> O <sub>5</sub>	-	-	-	-
ACGIH Carcinogen: A1=confirmed in humans, A2=suspected in humans, A3=confirmed in animals with unknown relevance to humans, A4=Not classifiable in humans, 5=Not suspected				
IARC Human Carcinogen: 1=Yes 2=Probably 2B=Possibly 3=Not classifiable in humans				
NIOSH Carcinogen: Entry in box=yes is potential occupational carcinogen				
NTP Carcinogen: K=Known to be R=Reasonably anticipated				
OSHA: Yes=OSHA regulated as carcinogen (29 CFR part 1910 Subpart Z)				

Mutagenicity of Material: See Specific Health Effects of Individual Components below.  
Reproductive Effects: See Specific Health Effects of Individual Components below.  
Teratogenicity of Material: See Specific Health Effects of Individual Components below.  
Synergistic Materials: See Specific Health Effects of Individual Components below.  
Aspiration Hazard: See Specific Health Effects of Individual Components below.  
Sensitization of Material: See Specific Health Effects of Individual Components below.

### Symptoms Related to the Physical, Chemical & Toxicological Characteristics:

Are shown below for several potential individual components. Also see "Section 2. Hazards Identification" and "Section 4. First Aid Measures"

### SPECIFIC HEALTH EFFECTS & OTHER HAZARDS OF INDIVIDUAL COMPONENTS

Aluminum (Al): Can irritate eyes, skin, and/or respiratory system. Concentrations of 5000 mg/m<sup>3</sup> of 5 micron in size have reportedly caused fibrosis. Finely divided dust may easily ignite and may cause explosions. Reacts with acid, other metals, halogens, carbon disulfide, or methyl chloride. See aluminum oxide.

Aluminum Oxide (Al<sub>2</sub>O<sub>3</sub>): Can irritate eyes, skin, and/or respiratory system. Noncombustible solid, but dusts may form explosive mixtures in air. Reacts with chlorine trifluoride, hot chlorinated rubber, acids, and oxidizers.

Chromium (Cr, Cr+3, Cr+6): The toxicity of chromium is dependent on its oxidation state. IARC lists certain hexavalent chromium compounds under its Group 1 category "confirmed carcinogenicity to humans" and metallic chromium under its Group 3 category "not classifiable as to their carcinogenicity to humans." Chromium metal is classified as carcinogenic by NTP. Dermatitis may result from exposure to chromium fumes. If metal is heated to high temperatures, as in welding, fumes produced may be toxic to the lungs. Under high temperatures, hexavalent chromium may be produced, if in the insoluble form it is designated a confirmed human carcinogen. Other health effects include nasal irritation and possible kidney and liver damage. Chromite dust may also cause skin ulceration, dermatitis and allergic skin reaction.

Cobalt (Co): Cobalt dust may result in an asthma-like condition (cough, shortness of breath). May cause interstitial fibrosis, pneumonitis, and sensitization of the respiratory tract and skin. Cobalt liberation during tungsten carbide machining is also associated with the development of hypersensitivity asthma. Hypersensitivity pneumonitis generally disappears when the exposure ceases. IARC lists metallic cobalt under its Group 2B category "possibly carcinogenic to humans".

Copper (Cu): Acute effects include irritation of the upper respiratory tract and may include a metallic or sweet taste. May also cause metal fume fever characterized by fever and chills (flue like symptoms) which appear 4 to 6 hours after exposure with no long term effects. Copper fumes may result in Wilson's Disease (characterized by hepatic cirrhosis, brain damage, demyelination, renal disease, and copper deposition in the cornea).

Iron (Fe): Iron salts can irritate eyes, skin, and mucous membrane. Other targets are the respiratory system and gastrointestinal tract. Exposure can cause abdominal pain, diarrhea, vomiting, and possible liver damage. See iron oxide.

Iron Oxide (Fe<sub>2</sub>O<sub>3</sub>): Repeated inhalation of iron oxide fume or dust causes benign pneumoconiosis (siderosis), but generally does not cause symptoms in the exposed person. Available toxicology data contain no evidence that an acute exposure to a high concentration of iron oxide dust and fume would impede escape or cause any irreversible health effects within 30 minutes.

Lead (Pb): Exposure can target eyes, gastrointestinal tract, central nervous system, kidneys blood, and gingival tissue. Can cause lassitude (weakness, exhaustion), insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis wrist, ankles, encephalopathy, kidney disease, eye irritation, and hypertension.

Lead (II) Oxide (PbO): Chronic effects may include chronic lead toxicity, toxicity to the central and peripheral nervous system affecting the cerebellum, spinal cord, motor and sensory nerves via inhalation. May cause anemia gingival lead line, paralysis in the wrist and permanent neurological injury, chronic lead toxicity, nephritis, scarring and shrinking of the kidney tissue via ingestion. Possible carcinogen.

Manganese (Mn) and Mn compounds: Over exposure can cause manganism (asthenia, insomnia, mental confusion), metal fume fever, dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever, low-back pain, vomiting, malaise (vague feeling of discomfort), lassitude

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(weakness, exhaustion), kidney damage. Symptoms of manganese poisoning range from sleepiness and weakness in the legs to difficulty in walking and uncontrolled laughter.

**Manganese Dioxide (MnO<sub>2</sub>):** Chronic exposure might affect lungs and lead to central nervous system symptoms of headache, changes in motor activity and psychological disturbances. Might increase susceptibility to bronchitis, pneumonitis and neurologic neuropsychiatric disorder. Animal tests show that it might cause toxicity to human reproduction or development. Existing studies are inadequate to assess carcinogenicity. May impact persons susceptible to Parkinson's disease and kidney disease. Decomposes on heating above 553 degree C producing manganese (III) oxide and oxygen, which increases fire hazard. As a strong oxidant, it reacts violently with combustible and reducing materials to cause fire and explosion hazard. Reacts violently with aluminum on heating.

**Molybdenum (Mo):** Available toxicology data contain no evidence that an acute exposure to a high concentration of molybdenum would impede escape or cause any irreversible health effects within 30 minutes. Mining and metallurgy workers chronically exposed to 60 to 600 mg Mo/m<sup>3</sup> reported an increased incidence of nonspecific symptoms that included weakness, fatigue, headache, anorexia, and joint and muscle pain. Animal studies involving ingestion (6000 mg Mo/kg) and inhalation (30,000 mg Mo/m<sup>3</sup> for 4 weeks or 12,000 mg MoO<sub>2</sub>/m<sup>3</sup> for 1 hour) showed no changes and/or fatalities. Molybdenum trioxide is an irritant to the eyes and mucous membranes. Fine particles can mix with air to explode. Reacts violently with oxidants, halogens and concentrated nitric acid causing fire.

**Nickel (Ni) & Nickel Compounds:** Short-term exposure may cause mechanical irritation, and the inhalation of fumes may cause pneumonitis. Long-term exposure may cause skin sensitization, asthma, and/or affect lungs. Nickel oxide fumes form at high temperatures and exposure can cause symptoms of asthma after a few hours have passed and physical effort initiated. Nickel compounds produce a variety of toxic effects. Soluble nickel salts cause contact dermatitis in sensitized individuals and eye irritation. Asthmatic lung disease has been reported among nickel-plating workers. Relatively short durations cause pathological changes in the lungs of experimental animals. Nickel and nickel compounds are potential carcinogens. Nickel refining and specific compounds are considered respiratory carcinogens to humans. The American Conference on Governmental Industrial Hygienists recommends that nickel compounds be differentiated according to solubility for their carcinogenic effects.

**Nitrogen (N):** Interstitial nitrogen and/or metal nitrides and metal nitrates are outside the scope of this SDS.

**Oxygen (O):** Interstitial oxygen and/or metal oxides are outside the scope of this SDS.

**Phosphorus (P):** Short-term exposure is corrosive to the eyes (redness), the skin (burns, blisters) and the respiratory tract (cough, labored breathing, sore throat); corrosive on ingestion. Inhalation of vapor may cause lung oedema, affect the kidneys and/or liver, and may result in unconsciousness or death.

Symptoms may be delayed. Long-term exposure may affect the bone. Phosphorus may spontaneously ignite on contact with air producing toxic phosphorus oxide. Phosphorus reacts violently with oxidants, halogens and sulfur, causing fire and explosion hazards. Phosphorus can react with strong bases to produce toxic gas (phosphine).

**Phosphorus Pentoxide (P<sub>4</sub>O<sub>10</sub>):** Reacts with moisture on body tissue surfaces to form phosphoric acid.

**Selenium (Se):** Short-term exposure is irritating to the eyes (redness, pain, blurred vision) and the respiratory tract (burning sensation, cough, labored breathing, sore throat). Inhalation of dust may cause lung oedema. Inhalation of fume may cause symptoms of asphyxiation, chills and fever and bronchitis. The effects may be delayed. Long term exposure with skin may cause dermatitis. Long-term exposure may have effects on the respiratory tract, gastrointestinal tract, and skin, resulting in nausea, vomiting, cough, yellowish skin, loss of nails, garlic breath and bad teeth. Ingestion may cause metallic taste, diarrhea, chills, fever.

**Selenium Dioxide (SeO<sub>2</sub>):** Short-term exposure is corrosive to the eyes (redness, pain, severe burns), the skin (redness, pain, burns, blisters) and the respiratory tract (burning sensation, cough, labored breathing, sore throat). Inhalation may cause lung oedema. Short-term exposure can result in allergic-type reaction of the eyelids (rose eye). Long-term exposure may cause skin sensitization. Long-term exposure can have effect on the respiratory tract, gastrointestinal tract, central nervous system and liver; resulting in nasal irritation, persistent garlic odor, stomach pain, nervousness and liver impairment. Ingestion may cause abdominal pain, burning sensation, sore throat, shock or collapse.

**Silicon (Si):** Irritates eyes (redness), skin (redness, roughness), and respiratory tract (cough). Reactive with halogens, oxidants, calcium, alkaline/metal carbonates, metal acetylides and cesium carbide. See silicon carbide.

**Silicon Dioxide (SiO<sub>2</sub>):** Silicon dioxide is chemically and biologically inert when ingested. Heavy exposure to freshly formed silica fume may cause an acute reaction similar to metal fume fever. Respirable quartz dust particles can be inhaled and deposited in the lung. Silicosis, lung cancer and pulmonary tuberculosis are associated with occupational exposure to quartz dust. There is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite dusts from occupational sources. Because amorphous silica is less fibrogenic than crystalline silica, silicosis has rarely been observed after exposure to pure amorphous silica.

**Sulfur (S):** Short-term exposure irritates eyes (redness, pain, & blurred vision), skin (redness) and respiratory tract (burning, cough, sore throat). Repeat exposure can cause skin dermatitis and may have effects on the respiratory tract, resulting in chronic bronchitis. Finely dispersed particles form explosive mixtures in air. Incompatible with strong oxidants.

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**Sulfur Dioxide (SO<sub>2</sub>):** Short-term exposure irritates eyes, skin, and respiratory system. May cause severe skin burns & eye damage, rhinorrhea (discharge of thin nasal mucus), choking (cough), and reflex bronchoconstriction. Incompatible with alkali metals (sodium & potassium), metal nitrates, metal oxides, metal acetylides, metal hydrides, rubidium carbide, chlorates, fluorine, water, ammonia, zinc, aluminum, brass, and copper.

**Tantalum (Ta):** Short-term exposure can irritate eyes (redness), skin, and respiratory system (cough), and can cause pulmonary irritation in animals. Considered to have a low order of toxicity. As surgical implant material, it has demonstrated its physiological inertness. Reactive with strong oxidizers, bromine trifluoride, and fluorine. Dry fine particles can ignite spontaneously and/or form explosive mixtures on contact with air.

**Titanium (Ti):** A mild pulmonary irritant generally regarded as a nuisance dust. See titanium dioxide.

**Titanium Dioxide (TiO<sub>2</sub>):** potential respiratory carcinogen. Available toxicology data contain no evidence that an acute exposure to a high concentration of titanium dioxide dust would impede escape or cause any irreversible health effects within 30 minutes.

**Tungsten (W):** Short-term exposure irritates eyes, skin, and respiratory system. Long-term exposure can cause diffuse pulmonary fibrosis, loss of appetite, nausea, cough and blood changes. Reactive with bromine trifluoride, chlorine trifluoride, fluorine, and iodine pentafluoride. Dry fine particles can ignite spontaneously and/or form explosive mixtures on contact with air.

**Vanadium (V):** No information found. See vanadium oxide and ferrovandium dust.

**Vanadium Pentoxide (V<sub>2</sub>O<sub>5</sub>):** Short term exposure can irritate eyes (redness), skin (redness), respiratory tract (sore throat, cough, metallic taste), and/or stomach (nausea, abdominal pain). Long term exposure can cause greenish-black discoloration of the tongue, fine rales, rhinitis, and/or bronchitis with wheezing and chest pain. Possible human carcinogen. Non-combustible solid, but may increase intensity of fire when in contact with combustible materials; giving off toxic fumes and/or gases. Reacts with lithium and chlorine trifluoride.

## SECTION 12: Ecological information

### 12.1. Ecotoxicity

No data available on this material in its solid state, however, individual components of the material have been found to be toxic to the environment.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Aluminum, Al	-	LC50 (Rainbow trout, 96h)=0.12mg/l Mortality	-	LC50 (Water flea, 24h)=3.5mg/l Mortality
Aluminum Oxide, Al <sub>2</sub> O <sub>3</sub>	-	-	-	-
Carbon, C				
Chromium, Cr		LC 50 (Goldfish (Carassius auratus), 7 d): 0.66 mg/l Mortality LC 50 (Carp (Cyprinus carpio), 96 h): 14.3 mg/l Mortality LC 50 (Fathead minnow (Pimephales promelas), 96 h): 37 mg/l Mortality LC 50 (Carp (Cyprinus carpio), 96 h): 93.6 mg/l Mortality		EC 50 (Water flea (Daphnia magna), 72 h): 5.2 mg/l Intoxication LC 50 (Water flea (Daphnia pulex), 96 h): 90.4 mg/l Mortality LC 50 (Water flea (Daphnia magna), 48 h): 0.022 mg/l Mortality LC 50 (Opossum shrimp (Americamysis bahia), 96 h): 1.56 - 2.45 mg/l Mortality
Chromium (hexavalent), Cr+6		96h LC50: > 139 mg/L (Cyprinus carpio) 96h LC50: 113.6 - 155.7 mg/L (Lepomis macrochirus) 96h LC50: = 320 mg/L (Lepomis macrochirus) 96h LC50: 65.6 - 137.6 mg/L (Lepomis		

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		<p>macrochirus) 96h LC50: = 12.3 mg/L (Oncorhynchus mykiss) 96h LC50: 21.209 - 30.046 mg/L (Oryzias latipes) 96h LC50: 15.41 - 30.36 mg/L (Pimephales promelas) 96h LC50: 14 - 20.9 mg/L (Pimephales promelas) 96h LC50: 24.81 - 34.55 mg/L (Poecilia reticulata) 96h LC50: 23 - 41.2 mg/L (Poecilia reticulata) 96h LC50: = 26  mg/L (Morone saxatilis)</p>		
Cobalt, Co		<p>LC50 96hr: &gt; 100mg/l static (Brachydanio rerio)</p>		
Copper, Cu	<p>EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata) LC 50 (Green algae (Scenedesmus dimorphus), 9 d): 0.0627 mg/l Mortality</p>	<p>LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: &lt; 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semistatic (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)</p>	<p>The 24 h NOEC of copper chloride for activated sludge ranged from 0.32 to 0.64 mg of Cu/L.</p>	<p>EC 50 (Water flea (Daphnia magna), 48 h): 0.102 mg/l Intoxication LC 50 (Water flea (Daphnia magna), 48 h): 0.026 - 0.036 mg/l Mortality The 48 h LC50 values for Daphnia magna exposed to copper in natural water ranged between 33.8 µg/L (pH 6.1, hardness 12.4 mg/L CaCO3, DOC 2.34 mg/L) and 792 µg/L (pH 7.35, hardness 139.7 mg/L CaCO3, DOC 22.8 mg/L).</p>

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Iron, Fe		LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis)	-	-
Iron Oxide, Fe2O3		The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge > 10,000 mg/L	The 48 h EC50 of iron oxide to Daphnia magna > 100 mg/L.
Lead, Pb	-	-	-	-
Lead Oxide, Pb3O4	-	-	-	-
Manganese, Mn	-	-	-	-
Manganese Dioxide, MnO2	-	-	-	-
Molybdenum, Mo	-	-	-	-
Nickel, Ni	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)  NOEC/EC10 values range from 12.3 µg/l for Scenedesmus accuminatus to 425 µg/l for Pseudokirchneriella subcapitata.	LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis)  The 96h LC50s values range from 0.4 mg Ni/L for Pimephales promelas to 320 mg Ni/L for Brachydanio rerio.	- The 30 min EC50 of nickel for activated sludge was 33mg Ni/L.  EC50 Freshwater Algae 72hr- 0.18mg/l	C50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)  The 48h LC50s values range from 0.013 mg Ni/L for Ceriodaphnia dubia to 4970 mg Ni/L for Daphnia magna.
Nitrogen, N	-	-	-	-
Oxygen, O	-	-	-	-
Phosphorus, P	-	-	-	-
Phosphorus Pentoxide, P4O10	-	-	-	-
Selenium, Se	-	-	-	-
Selenium Dioxide, SeO2	-	-	-	-
Silicon, Si	-	-	-	-
Sulfur, S	-	LC50>180 mg/l @96h for Oncorhynchus mykiss (rainbow trout) LC50=866 mg/l @96h for other fish	-	EC50>5000 mg/l @48h for Daphnia magna (water flea)
Sulfur Dioxide, SO2	-	-	-	-

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Tantalum, Ta	-	-	-	-
Titanium, Ti	-	-	-	-
Titanium Dioxide, TiO <sub>2</sub>	The 72 h EC50 of titanium dioxide to <i>Pseudokirchnerella subcapitata</i> was 61 mg of TiO <sub>2</sub> /L.	The 96 h LC50 of titanium dioxide to <i>Cyprinodon variegatus</i> >10,000 mg of TiO <sub>2</sub> /L. The 96 h LC50 of titanium dioxide to <i>Pimephales promelas</i> > 1,000 mg of TiO <sub>2</sub> /L .	The 3 h EC50 of titanium dioxide for activated sludge > 1000 mg/L.	The 48 h EC50 of titanium dioxide to <i>Daphnia Magna</i> > 1000 mg of TiO <sub>2</sub> /L.
Tungsten, W				
Vanadium, V	The 72 h EC50 of vanadium pentoxide to <i>Desmodesmus subspicatus</i> was 2,907 ug of V/L.	The 96 h LC50 of vanadium pentoxide to <i>Pimephales promelas</i> was 1,850 ug of V/L .	The 3 h EC50 of sodium metavanadate for activated sludge >100 mg/L.	The 48 h EC50 of sodium vanadate to <i>Daphnia magna</i> was 2,661 ug of V/L.
Vanadium Oxide, O5V2	-	-	-	-

### 12.2. Persistence and degradability

No data available

### 12.3. Bioaccumulative potential

No data available

### 12.4. Mobility in soil

No data available

### 12.5. Results of PBT and vPvB Assessment

No data available

### 12.5. Other Adverse Effects

Dissolved metals can be dangerous to drinking water aquifer even in small quantities.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

**Waste Disposal Methods:** Recycle when possible. When disposed of as a waste, it would be considered hazardous waste when chromium constituent is present. Wastes must be tested using methods described in 40 CFR Part 261. It is the generator's responsibility to determine if the waste meets applicable definitions of hazardous wastes. Dispose of waste material according to Local, State, Federal and Provincial Environmental Regulations.

**Packaging Disposal:** Dispose of containers in compliance with local, state, and federal regulations. When possible, use metal containers and recycle along with metal material.


## SECTION 14: Transport information

SHIPPING INFORMATION	AS MATERIAL PRODUCT OR RECYCLABLE	AS DISPOSED WASTE, IT COULD BECOME (when chromium present):
Regulated	Not regulated by DOT or RCRA	Regulated by DOT and RCRA
Proper Shipping Name & Description	Not applicable	Environmentally hazardous substances, solid, n.o.s
UN Number	Not applicable	UN3077
Hazard Class	Not applicable	9
Packing/Risk Group	Not applicable	PG III
ERG Response #	Not applicable	ERG# 171

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Labels	Not applicable	 <p>Miscellaneous Dangerous Good Label</p>
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### SECTION 15: Regulatory information

#### 15.1. Safety, Health and Environmental regulations/legislation specific for substance or mixture

The Clean Air Act, the Clean Water Act and Resource Conservation & Recovery Act may apply to the processing of metal particulates and air emissions. The following lists of regulation may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Regulation	Aluminum, Al	Chromium, Cr	Cobalt, Co	Copper, Cu	Iron, Fe	Lead, Pb	Manganese, Mn	Molybdenum, Mo	Nickel, Ni	Selenium, Se	Silicon, Si	Tantalum, Ta	Titanium, Ti	Tungsten, W	Vanadium, V
EPCRA SARA 302 EHS TPQ (40 CFR 355 App. A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EPCRA SARA 304 EHS RQ (40 CFR Table 302.4)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EPCRA SARA 311/312	Chronic		Chronic	Chronic			Chronic			Acute, Chronic health					
EPCRA SARA 313 (40 CFR 372.65) Mfg=25,000# Other= 10,000#	Fume &Dust only	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes, Except when in alloy
EPCRA SARA 313 Threshold Value %	1.0 Fume &Dust only	1.0	0.1	1.0	n/a	0.1 if in alloy	1.0	n/a	0.1	1.0	n/a	n/a	n/a	n/a	1.0, Except in alloy
TSCA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



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CAA Section 112(r) TQ (pounds)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CWA Toxic Pollutant	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	No	No
CWA Priority Pollutant (40 CFR part 423 app A)	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	No	No
CWA Hazardous Substance (Section 311(b)(4))	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
CERCLA RQ (pounds)	n/a	5000	n/a	5000	n/a	10	n/a	n/a	100	100	n/a	n/a	n/a	n/a	n/a
REACH SVHC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REACH Authorisation for Use (Annex XIV)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REACH Condition of Restriction (Annex XVII)	-	-	-	-	-	Yes	-	-	Yes (jewelry)	-	-	-	-	-	-
California Proposition 65 known to cause cancer	No	No	Yes (powder)	No	No	Yes	No	No	Yes	No	No	No	No	No	No
California Proposition 65 Developmental Toxicity	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No
California Proposition 65 Male Reproductive Toxicity	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No
California Proposition 65 Female Reproductive Toxicity	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No
Regulation >	Aluminum, Al	Chromium, Cr	Cobalt, Co	Copper, Cu	Iron, Fe	Lead, Pb	Manganese, Mn	Molybdenum , Mo	Nickel, Ni	Selenium, Se	Silicon, Si	Tantalum, Ta	Titanium, Ti	Tungsten, W	Vanadium, V

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### SECTION 16: Other information

Key/Legend:

ACGIH = American Conference of Governmental Industrial Hygienists

Action Level = 8-hour time-weighted average concentration that initiates certain required activities such as exposure monitoring and medical surveillance.

CAA = Clean Air Act

CAT# = Category Code Number for GHS Hazard

CERCLA = Comprehensive Environmental Response, Compensation and Liability Act

CFR = Code of Federal Regulations

CWA = Clean Water Act

EHS = Extremely Hazardous Substance

EPA = Environmental Protection Agency

EPCRA = Emergency Planning and Community Right-To-Know Act

Hazard Codes for GHS that are applicable if used in SDS sections above:

H228 = Flammable solid.

H252 = Self-heating in large quantities; may catch fire.

H260 = In contact with water releases flammable gases which may ignite spontaneously.

H261 = In contact with water releases flammable gases.

H300 = Fatal if swallowed. H301 = Toxic if swallowed.

H302 = Harmful if swallowed. H310 = Fatal in contact with skin.

H314 = Causes severe skin burns and eye damage.

H315 = Causes skin irritation.

H317 = May cause an allergic skin reaction. H318 = Causes serious eye damage.

H319 = Causes serious eye damage. H330 = Fatal if inhaled.

H331 = Toxic if inhaled.

H332 = Harmful if inhaled.

H334 = May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H335 = May cause respiratory irritation.

H340 = May cause genetic defects.

H341 = Suspected of causing genetic defects H350 = May cause cancer.

H351 = Suspected of causing cancer.

H360 = May damage fertility or the unborn child.

H361 = Suspected of damaging fertility or the unborn child.

H372 = Causes damage to organs ( ) through prolonged or repeated exposure ( ).

H373 = May cause damage to organs through prolonged or repeated exposure.

H400 = Very toxic to aquatic life.

H410 = Very toxic to aquatic life with long lasting effects.

H412 = Harmful to aquatic life with long lasting *effects*.

HMIS = Hazardous Material Identification System

HNOC = Hazards Not Otherwise Classified

IARC = International Agency for Research on Cancer

IDLH = Immediately Dangerous to Life or Health

LD<sub>50</sub> = LD stands for "Lethal Dose".

LD<sub>50</sub> is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals. The LD<sub>50</sub> is one way to measure the short-term poisoning potential (acute toxicity) of a material.

LC<sub>50</sub> = LC stands for "Lethal Concentration". LC values usually refer to the concentration of a chemical in air but in environmental studies it can also mean the concentration of a chemical in water.

MSHA = Mine Safety and Health Administration

n/a = Not applicable.

NFPA = National Fire Protection Association

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NIOSH = National Institute for Occupational Safety and Health

NTP = National Toxicology Program

PEL = Permissible Exposure Limit based on an 8-hour time weighted average.

OSHA = Occupational Safety and Health Administration (United States of America)

REACH = Registration, Evaluation, Authorization and Restriction of Chemicals (European Union)

RQ = Reportable Quantity

SARA = Superfund Amendments and Reauthorization Act

ST = Short Term Exposure Limit (15-minute TWA exposure that should not be exceeded).

STEL = Short Term Exposure Limit (15-minute TWA exposure that should not be exceeded).

STOT RE= Specific Target Organ Toxicity (Repeat Exposure)

STOT SE= Specific Target Organ Toxicity (Short Term Exposure)

SVHC = Substance of Very High Concern

TPQ = Threshold Planning Quantity

TLV = Threshold Limit Value

TSCA = Toxic Substance Control Act

TWA = Time Weighted Average

WT% = Weight percent

*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.*