

### SECTION 1: IDENTIFICATION

**Product Identifier**

**Product Form:** Mixture

**Product Name:** Carbon and Alloy Steels

**Synonyms:** Bar, Sheet, Plate, Tubing, Pipe, Structural

**Intended Use of the Product**

Solid product, various forms and uses

**Name, Address, and Telephone of the Responsible Party**

**Company**

Joseph T. Ryerson & Son, Inc.  
227 W Monroe St., 27th Floor  
Chicago, Illinois 60606  
T (312) 292-5000

www.ryerson.com

**Emergency Telephone Number**

**Emergency Number** : CHEMTREC (US Transportation): (800) 424-9300 CANUTEC (Canadian Transportation): (613) 996-6666  
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

### SECTION 2: HAZARDS IDENTIFICATION

**Classification of the Substance or Mixture**

**GHS-US classification**

Not classified

**Label Elements**

**GHS-US Labeling** No labeling applicable

**Other Hazards**

This product as shipped is physiologically inert in its solid 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. The below listing is a summary of elements used in carbon and alloy steels. Various grades will contain different combinations of these elements. Other trace elements may also be present in minute amounts. These small quantities (less than 0.1%) are frequently referred to as “trace” or “residual” elements; generally they originate in the raw material used. Such elements would include arsenic (As), beryllium (Be), cobalt (Co), lead (Pb), mercury (Hg) less than 0.01%, oil mist (mineral1), oxygen (O), selenium (Se), tellurium (Te), and zirconium (Zr). Various byproducts of processing from these trace elements may include lead chromate, ozone, polybrominated biphenyls (PBB), and polybrominated diphenyl ether (PBDE), cadmium (Cd) less than 0.01%, and these byproducts may also be considered trace. If listed in the above table, the ingredient is considered to be a component rather than trace. \*Carbon and alloy steel products as provided contain chromium metal in the zero valence state. As such, chromium metal does not present any unusual health hazard. However, welding, torch cutting, brazing, or grinding of chromium metal in carbon and alloy steel may generate airborne concentrations of hexavalent chromium.

**Unknown Acute Toxicity (GHS-US)** Not available

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

**Mixture**

Name	Product Identifier	% (w/w)	GHS-US classification
Iron	(CAS No) 7439-89-6	> 80	Comb. Dust Flam. Sol. 1, H228 Self-heat. 1, H251
Chromium	(CAS No) 7440-47-3	<= 11	Comb. Dust
Zinc	(CAS No) 7440-66-6	<= 10	Comb. Dust
Nickel	(CAS No) 7440-02-0	<= 9.5	Comb. Dust Skin Sens. 1, H317

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			Carc. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412
Carbon	(CAS No) 7440-44-0	<= 5.5	Comb. Dust
Molybdenum	(CAS No) 7439-98-7	<= 5	Comb. Dust
Silicon	(CAS No) 7440-21-3	<= 4	Comb. Dust
Manganese	(CAS No) 7439-96-5	<= 3	Comb. Dust
Copper	(CAS No) 7440-50-8	<= 2.5	Comb. Dust Aquatic Acute 1, H400 Aquatic Chronic 3, H412
Aluminum	(CAS No) 7429-90-5	<= 2	Comb. Dust Flam. Sol. 1, H228 Water-react. 2, H261
Sulfur	(CAS No) 7704-34-9	<= 2	Comb. Dust Skin Irrit. 2, H315 Aquatic Acute 3, H402
Bismuth	(CAS No) 7440-69-9	<= 1.5	Not classified
Titanium	(CAS No) 7440-32-6	<= 1	Comb. Dust Flam. Sol. 1, H228
Vanadium	(CAS No) 7440-62-2	<= 1	Comb. Dust
Tungsten	(CAS No) 7440-33-7	<= 0.9	Comb. Dust Flam. Sol. 1, H228 Self-heat. 2, H252
Antimony	(CAS No) 7440-36-0	<= 0.9	Comb. Dust Acute Tox. 3 (Oral), H301 Carc. 2, H351 Aquatic Chronic 3, H412
Boron	(CAS No) 7440-42-8	<= 0.9	Comb. Dust
Calcium	(CAS No) 7440-70-2	<= 0.9	Water-react. 2, H261
Tin	(CAS No) 7440-31-5	<= 0.9	Comb. Dust
Niobium	(CAS No) 7440-03-1	<= 0.9	Comb. Dust Flam. Sol. 1, H228
Nitrogen	(CAS No) 7727-37-9	<= 0.9	Simple Asphy, H380 Compressed gas, H280
Phosphorus elemental	(CAS No) 7723-14-0	<= 0.9	Acute Tox. 1 (Oral), H300 Acute Tox. 2 (Dermal), H310 Acute Tox. 4 (Inhalation:dust,mist), H332 Aquatic Acute 3, H402 Flam. Sol. 1, H228 Aquatic Chronic 3, H412
Magnesium	(CAS No) 7439-95-4	<= 0.9	Comb. Dust Flam. Sol. 1, H228 Self-heat. 1, H251 Water-react. 2, H261
Selenium	(CAS No) 7782-49-2	<= 0.9	Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation:dust,mist), H331 STOT RE 2, H373 Aquatic Chronic 4, H413
Tellurium	(CAS No) 13494-80-9	<= 0.5	Comb. Dust Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Inhalation:dust,mist), H332 Skin Sens. 1B, H317 Repr. 1B, H360

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			Aquatic Chronic 4, H413
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Full text of H-phrases: see section 16

### SECTION 4: FIRST AID MEASURES

#### Description of First Aid Measures

**General:** If injury occurs or if you feel unwell seek medical advice.

**Inhalation:** If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

**Skin Contact:** Cool skin rapidly with cold water after contact with molten product. Removal of solidified molten material from skin requires medical assistance. Remove contaminated clothing. Wash contaminated clothing before reuse. Obtain medical attention if irritation develops or persists.

**Eye Contact:** 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.

**Ingestion:** If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

#### Most Important Symptoms and Effects Both Acute and Delayed

**General:** Under normal conditions of use not expected to present a significant hazard. Under milling, or physical alteration metal dusts may be produced that cause irritation of the respiratory tract, skin, and may be harmful. Molten material may release toxic, and irritating fumes.

**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.

**Skin Contact:** Dust may cause irritation in skin folds or by contact in combination with tight clothing. Contact with hot, molten metal will cause thermal burns.

**Eye Contact:** Dust generated from material cutting may cause a slight irritation. Slivers may be generated, which could cause mechanical irritation or injure the eye. Dusts caused from milling and physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes.

**Ingestion:** If large amounts are ingested: Gastrointestinal irritation.

**Chronic Symptoms:** In massive form, no hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material: 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. Chromium: Certain hexavalent chromium compounds have been demonstrated to be carcinogenic on the basis of epidemiological investigations on workers and experimental studies in animals. Increased incidences of respiratory cancer have been found in chromium (VI) workers. There is an increased incidence of lung cancer in industrial workers exposed to chromium (VI) compounds. Please refer to IARC volume 23 for a more detailed discussion. Nickel: May cause a form of dermatitis known as nickel itch and intestinal irritation, which may cause disorders, convulsions and asphyxia. . 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. Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis. 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. Antimony: Exposure to antimony dusts and fume may result in irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly. Inhalation of iron oxide fumes undergoing decomposition may cause irritation and flu-like symptoms, otherwise iron oxide is not hazardous. . 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. Zinc: Prolonged exposure to high concentrations of zinc fumes may cause "zinc shakes", an involuntary twitching of the muscles. Otherwise, zinc is non-toxic.

#### Indication of Any Immediate Medical Attention and Special Treatment Needed

If medical advice is needed, have product container or label at hand.

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### SECTION 5: FIRE-FIGHTING MEASURES

#### Extinguishing Media

**Suitable Extinguishing Media:** Cover with sand or earth. metal fire extinction powder. Use extinguishing media appropriate for surrounding fire.

**Unsuitable Extinguishing Media:** Do not use water jet. Use of heavy stream of water may spread fire.

#### Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** In massive form: Not flammable. In powdered form: Metallic dusts may ignite or explode. Fire may produce irritating and/or toxic gases.

**Explosion Hazard:** In massive form: None known. In powdered form: Combustible dust. Dust clouds can be explosive. Avoid dust clouds in combination with static electricity.

**Reactivity:** Product itself is not explosive but if dust is generated, dust clouds suspended in air can be explosive.

#### Advice for Firefighters

**Precautionary Measures Fire:** Not available

**Firefighting Instructions:** Do not breathe fumes from fires or vapours from decomposition. Keep upwind.

**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.

**Hazardous Combustion Products:**Not available

#### Reference to Other Sections

Refer to section 9 for flammability properties.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures** Not available

#### For Non-Emergency Personnel

**Protective Equipment:** Wear eye protection.

**Emergency Procedures:** Avoid creating or spreading dust. Eliminate ignition sources.

#### For Emergency Personnel

**Protective Equipment:** Safety glasses.

**Emergency Procedures:** Ventilate area. Eliminate ignition sources. Evacuate unnecessary personnel.

#### Environmental Precautions

Do not allow to enter drains or water courses.

#### Methods and Material for Containment and Cleaning Up

**For Containment:** Contain and collect as any solid.

**Methods for Cleaning Up:** Avoid generation of dust during clean-up of spills. Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up. Use only non-sparking tools. Use explosion-proof equipment.

**Reference to Other Sections** No additional information available

### SECTION 7: HANDLING AND STORAGE

#### Precautions for Safe Handling

**Additional Hazards When Processed:** Do not handle until all safety precautions have been read and understood. In powdered form: Fine dust dispersed in air may ignite. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.

**Precautions for Safe Handling:** Do not breathe dust. Do not get in eyes, on skin, or on clothing. Avoid creating or spreading dust. Always wash hands after handling the product. Do not eat, drink or smoke when using this product. Ensure there is adequate ventilation. Wear recommended personal protective equipment.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Always wash your hands immediately after handling this product, and once again before leaving the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke in areas where product is used.

#### Conditions for Safe Storage, Including Any Incompatibilities

**Storage Conditions:** Store in original container. Store in a dry, cool place. Store in a well-ventilated place. Keep container tightly closed.

#### Specific End Use(s)

Solid product, various forms and uses

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### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 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), OSHA (PEL), Canadian provincial governments, or the Mexican government

<b>Chromium (7440-47-3)</b>		
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
USA IDLH	US IDLH (mg/m <sup>3</sup> )	250 mg/m <sup>3</sup>
Alberta	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
British Columbia	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Manitoba	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Newfoundland & Labrador	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Nova Scotia	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Nunavut	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
Nunavut	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (metal)
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (metal)
Ontario	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Prince Edward Island	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Québec	VEMP (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Saskatchewan	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
Saskatchewan	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Yukon	OEL STEL (mg/m <sup>3</sup> )	3.0 mg/m <sup>3</sup>
Yukon	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Nickel (7440-02-0)</b>		
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
USA ACGIH	ACGIH chemical category	Not Suspected as a Human Carcinogen
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.015 mg/m <sup>3</sup>
USA IDLH	US IDLH (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
Alberta	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
British Columbia	OEL TWA (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>
Manitoba	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Newfoundland & Labrador	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
Nova Scotia	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
Nunavut	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Nunavut	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (inhalable fraction)
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
Ontario	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable)
Prince Edward Island	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
Québec	VEMP (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Saskatchewan	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (inhalable fraction)
Saskatchewan	OEL TWA (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (inhalable fraction)
Yukon	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Yukon	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>

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<b>Manganese (7439-96-5)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	0.02 mg/m <sup>3</sup> (respirable fraction) 0.1 mg/m <sup>3</sup> (inhalable fraction)
<b>USA ACGIH</b>	ACGIH chemical category	Not Classifiable as a Human Carcinogen
<b>USA OSHA</b>	OSHA PEL (Ceiling) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (fume)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (fume)
<b>USA NIOSH</b>	NIOSH REL (STEL) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	500 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	0.02 mg/m <sup>3</sup> (respirable fraction) 0.1 mg/m <sup>3</sup> (inhalable fraction)
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	0.02 mg/m <sup>3</sup> (respirable fraction) 0.1 mg/m <sup>3</sup> (inhalable fraction)
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	0.02 mg/m <sup>3</sup> (respirable fraction) 0.1 mg/m <sup>3</sup> (inhalable fraction)
<b>Nunavut</b>	OEL Ceiling (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (fume)
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (fume)
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	0.02 mg/m <sup>3</sup> (respirable fraction) 0.1 mg/m <sup>3</sup> (inhalable fraction)
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (total dust and fume)
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Yukon</b>	OEL Ceiling (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Molybdenum (7439-98-7)</b>		
	Internal TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (Molybdenum (as Mo), Soluble Compounds)
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (Molybdenum (as Mo), Soluble Compounds) 15 mg/m <sup>3</sup> (Molybdenum (as Mo), Insoluble Compounds) (Total dust)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (Molybdenum (as Mo), Soluble Compounds)
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	5000 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total) 3 mg/m <sup>3</sup> (respirable)
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable) 10 mg/m <sup>3</sup> (inhalable)
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (metal-inhalable fraction) 6 mg/m <sup>3</sup> (metal-respirable fraction)
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal-inhalable fraction) 3 mg/m <sup>3</sup> (metal-respirable fraction)

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<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal-inhalable) 3 mg/m <sup>3</sup> (metal-respirable)
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (inhalable fraction) 6 mg/m <sup>3</sup> (respirable fraction)
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 3 mg/m <sup>3</sup> (respirable fraction)
<b>Silicon (7440-21-3)</b>		
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable fraction)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 3 mg/m <sup>3</sup> (respirable fraction)
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (respirable mass) 10 mg/m <sup>3</sup> (total mass)
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (containing no Asbestos and <1% Crystalline silica-total dust)
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Yukon</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup>
<b>Yukon</b>	OEL TWA (mg/m <sup>3</sup> )	30 mppcf 10 mg/m <sup>3</sup>
<b>Tungsten (7440-33-7)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>USA ACGIH</b>	ACGIH STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (STEL) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Alberta</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Ontario</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>

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<b>Yukon</b>	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Yukon</b>	OEL TWA (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
<b>Aluminum (7429-90-5)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
<b>USA ACGIH</b>	ACGIH chemical category	Not Classifiable as a Human Carcinogen
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable fraction)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 5 mg/m <sup>3</sup> (respirable dust)
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (dust)
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	1.0 mg/m <sup>3</sup> (respirable)
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal dust)
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (metal-dust)
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal-dust)
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable)
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (dust)
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (dust)
<b>Antimony (7440-36-0)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	50 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Yukon</b>	OEL STEL (mg/m <sup>3</sup> )	0.75 mg/m <sup>3</sup>
<b>Yukon</b>	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
<b>Copper (7440-50-8)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume)
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust and mist)



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		0.1 mg/m <sup>3</sup> (fume)
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup> (dust, fume and mist)
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust and mist) 0.2 mg/m <sup>3</sup> (fume)
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume)
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume)
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume)
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup> (fume) 2 mg/m <sup>3</sup> (dust and mist)
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (dust and mist) 0.6 mg/m <sup>3</sup> (fume)
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume)
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup> (fume) 3 mg/m <sup>3</sup> (dust and mist)
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Yukon</b>	OEL STEL (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 2 mg/m <sup>3</sup> (dust and mist)
<b>Yukon</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
<b>Nitrogen (7727-37-9)</b>		
<b>USA ACGIH</b>	ACGIH chemical category	Simple asphyxiant See Appendix F: Minimal Oxygen Content
<b>Phosphorus elemental (7723-14-0)</b>		
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup> (yellow)
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup> (yellow)
<b>New Brunswick</b>	OEL TWA (ppm)	0.02 ppm (yellow)
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup> (yellow)
<b>Selenium (7782-49-2)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>

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<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	0.6 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup>
<b>Sulfur (7704-34-9)</b>		
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
<b>Tellurium (13494-80-9)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>USA OSHA</b>	OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	25 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL STEL (mg/m <sup>3</sup> )	0.3 mg/m <sup>3</sup>
<b>Nunavut</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	0.3 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	0.3 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Yukon</b>	OEL STEL (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Yukon</b>	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
<b>Tin (7440-31-5)</b>		
<b>USA ACGIH</b>	ACGIH TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>USA IDLH</b>	US IDLH (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>
<b>Alberta</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>British Columbia</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Manitoba</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>New Brunswick</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Newfoundland &amp; Labrador</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Nova Scotia</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Northwest Territories</b>	OEL STEL (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (metal)
<b>Northwest Territories</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (metal)
<b>Ontario</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Prince Edward Island</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Québec</b>	VEMP (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL STEL (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup>
<b>Saskatchewan</b>	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
<b>Vanadium (7440-62-2)</b>		
<b>USA OSHA</b>	OSHA PEL (Ceiling) (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (respirable dust) 0.1 mg/m <sup>3</sup> (fume)
<b>USA NIOSH</b>	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
<b>USA NIOSH</b>	NIOSH REL (STEL) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>

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### Exposure Controls

**Appropriate Engineering Controls:** Ensure adequate ventilation, especially in confined areas. In powdered form: Avoid dust production. Take precautionary measures against static discharges. Use explosion-proof equipment.

**Personal Protective Equipment:** During metal processing, . Safety glasses. Gloves. Protective clothing. Insufficient ventilation: wear respiratory protection.



**Materials for Protective Clothing: Not available**

**Hand Protection:** Impermeable protective gloves.

**Eye Protection:** Safety glasses.

**Skin and Body Protection: Not available**

**Respiratory Protection:** Fumes and dust : If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Gray,Metallic
Odor	: Odorless
Odor Threshold	: Not available
pH	: Not available
Evaporation Rate	: Not available
Melting Point	: 1538 °C (2800.4 °F)
Freezing Point	: Not available
Boiling Point	: Not available
Flash Point	: Not available
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20 °C	: Not available
Relative Density	: 7.6 - 7.8
Specific Gravity	: Not available
Solubility	: Water: Insoluble
Partition Coefficient: N-Octanol/Water	: Not available
Viscosity	: Not available
Explosion Data – Sensitivity to Mechanical Impact	: Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge	: Dust cloud in combination with the static electricity can very be explosive
VOC content	: 0 %

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### SECTION 10: STABILITY AND REACTIVITY

**Reactivity:** Product itself is not explosive but if dust is generated, dust clouds suspended in air can be explosive.

**Chemical Stability:** Product is stable.

**Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.

**Conditions to Avoid:** 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.

**Incompatible Materials:** Incompatible with : strong acids. Mineral acids. Corrosive substances in contact with metals may produce flammable hydrogen gas.

**Hazardous Decomposition Products:** Under conditions of fire this material may produce: Metal oxides.

### SECTION 11: TOXICOLOGICAL INFORMATION

#### Information on Toxicological Effects - Product

**Acute Toxicity:** Inhalation:dust,mist: Not classified.

**LD50 and LC50 Data:** Not available

**Skin Corrosion/Irritation:** Not classified

**Serious Eye Damage/Irritation:** Not classified

**Respiratory or Skin Sensitization:** Not classified. Not classified.

**Germ Cell Mutagenicity:** Not classified

**Teratogenicity:** Not available

**Carcinogenicity:** Not classified.

**Specific Target Organ Toxicity (Repeated Exposure):** Not classified.

**Reproductive Toxicity:** Not classified.

**Specific Target Organ Toxicity (Single Exposure):** Not classified

**Aspiration Hazard:** Not classified

**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.

**Symptoms/Injuries After Skin Contact:** Dust may cause irritation in skin folds or by contact in combination with tight clothing. Contact with hot, molten metal will cause thermal burns.

**Symptoms/Injuries After Eye Contact:** Dust generated from material cutting may cause a slight irritation. Slivers may be generated, which could cause mechanical irritation or injure the eye. Dusts caused from milling and physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes.

**Symptoms/Injuries After Ingestion:** If large amounts are ingested: Gastrointestinal irritation.

**Chronic Symptoms:** In massive form, no hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material: 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. Chromium: Certain hexavalent chromium compounds have been demonstrated to be carcinogenic on the basis of epidemiological investigations on workers and experimental studies in animals. Increased incidences of respiratory cancer have been found in chromium (VI) workers. There is an increased incidence of lung cancer in industrial workers exposed to chromium (VI) compounds. Please refer to IARC volume 23 for a more detailed discussion. Nickel: May cause a form of dermatitis known as nickel itch and intestinal irritation, which may cause disorders, convulsions and asphyxia. . 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. Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis. 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. Antimony: Exposure to antimony dusts and fume may result in irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly. Inhalation of iron oxide fumes undergoing decomposition may cause irritation and flu-like symptoms, otherwise iron oxide is not hazardous. . 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.

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Zinc: Prolonged exposure to high concentrations of zinc fumes may cause "zinc shakes", an involuntary twitching of the muscles. Otherwise, zinc is non-toxic.

### Information on Toxicological Effects - Ingredient(s)

#### LD50 and LC50 Data:

<b>Chromium (7440-47-3)</b>	
LD50 Oral Rat	> 5000 mg/kg
LC50 Inhalation Rat	> 5.41 mg/l/4h
<b>Nickel (7440-02-0)</b>	
LD50 Oral Rat	> 9000 mg/kg
<b>Manganese (7439-96-5)</b>	
LD50 Oral Rat	> 2000 mg/kg
LC50 Inhalation Rat	> 5.14 mg/l/4h
<b>Molybdenum (7439-98-7)</b>	
LD50 Oral Rat	> 2000 mg/kg
LD50 Dermal Rat	> 2000 mg/kg
LC50 Inhalation Rat	> 3.92 mg/l/4h
<b>Silicon (7440-21-3)</b>	
LD50 Oral Rat	3160 mg/kg
ATE US (oral)	3,160.00 mg/kg body weight
<b>Carbon (7440-44-0)</b>	
LD50 Oral Rat	> 10000 mg/kg
<b>Antimony (7440-36-0)</b>	
LD50 Oral Rat	100 mg/kg
ATE US (oral)	100.00 mg/kg body weight
<b>Bismuth (7440-69-9)</b>	
LD50 Oral Rat	5 g/kg
ATE US (oral)	5,000.00 mg/kg body weight
<b>Boron (7440-42-8)</b>	
LD50 Oral Rat	> 2000 mg/kg
<b>Iron (7439-89-6)</b>	
LD50 Oral Rat	98.6 g/kg
ATE US (oral)	98,600.00 mg/kg body weight
<b>Magnesium (7439-95-4)</b>	
LD50 Oral Rat	230 mg/kg
ATE US (oral)	230.00 mg/kg body weight
<b>Niobium (7440-03-1)</b>	
LD50 Oral Rat	> 10 g/kg
<b>Phosphorus elemental (7723-14-0)</b>	
LD50 Oral Rat	3030 µg/kg
LD50 Dermal Rat	100 mg/kg
LC50 Inhalation Rat	4.3 mg/l (Exposure time: 1 h)
ATE US (oral)	3.03 mg/kg body weight
ATE US (dermal)	100.00 mg/kg body weight
ATE US (vapors)	4.30 mg/l/4h
ATE US (dust, mist)	4.30 mg/l/4h
<b>Selenium (7782-49-2)</b>	
LD50 Oral Rat	6700 mg/kg
ATE US (oral)	100.00 mg/kg body weight

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ATE US (dust, mist)	0.50 mg/l/4h
<b>Sulfur (7704-34-9)</b>	
LD50 Oral Rat	> 3000 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg
LC50 Inhalation Rat	> 9.23 mg/l/4h
<b>Tellurium (13494-80-9)</b>	
LD50 Oral Rat	83 mg/kg
LC50 Inhalation Rat	> 2420 mg/m <sup>3</sup> (Exposure time: 4 h)
LC50 Inhalation Rat	2.42 mg/l/4h
ATE US (oral)	83.00 mg/kg body weight
ATE US (dust, mist)	2.42 mg/l/4h
<b>Tin (7440-31-5)</b>	
LD50 Oral Rat	700 mg/kg
<b>Chromium (7440-47-3)</b>	
IARC Group	3
<b>Nickel (7440-02-0)</b>	
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.
<b>Selenium (7782-49-2)</b>	
IARC Group	3

## SECTION 12: ECOLOGICAL INFORMATION

**Toxicity** No additional information available

<b>Nickel (7440-02-0)</b>	
LC50 Fish 1	100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio)
EC50 Daphnia 1	121.6 µg/l (Exposure time: 48h - Species: Ceriodaphnia dubia [static])
LC 50 Fish 2	15.3 mg/l
EC50 Daphnia 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])
<b>Manganese (7439-96-5)</b>	
NOEC chronic fish	3.6 mg/l (Exposure time: 96h; Species: Oncorhynchus mykiss)
<b>Copper (7440-50-8)</b>	
LC50 Fish 1	0.0068 (0.0068 - 0.0156) mg/l (Exposure time: 96 h - Species: Pimephales promelas)
EC50 Daphnia 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])
LC 50 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])
<b>Phosphorus elemental (7723-14-0)</b>	
LC50 Fish 1	33.2 mg/l Red Phosphorous (Exposure time: 96 h - Species Danio rerio [static])
EC50 Daphnia 1	0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC 50 Fish 2	0.001 - 0.004 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 Daphnia 2	0.025 - 0.037 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
<b>Sulfur (7704-34-9)</b>	
LC50 Fish 1	866 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
EC50 Daphnia 1	736 mg/l
LC 50 Fish 2	14 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

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<b>Zinc (7440-66-6)</b>	
<b>LC50 Fish 1</b>	2.16 - 3.05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
<b>EC50 Daphnia 1</b>	0.139 - 0.908 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
<b>LC 50 Fish 2</b>	0.211 - 0.269 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static])
<b>ErC50 (algae)</b>	0.15 mg/l

### Persistence and Degradability

<b>Carbon and Alloy Steels</b>	
<b>Persistence and Degradability</b>	Not readily biodegradable.
<b>Copper (7440-50-8)</b>	
<b>Persistence and Degradability</b>	Not readily biodegradable.

### Bioaccumulative Potential

<b>Phosphorus elemental (7723-14-0)</b>	
<b>BCF Fish 1</b>	< 200

**Mobility in Soil** Not available

**Other Adverse Effects** Not available

## SECTION 13: DISPOSAL CONSIDERATIONS

**Sewage Disposal Recommendations:** Do not empty into drains; dispose of this material and its container in a safe way.

**Waste Disposal Recommendations:** Dispose of waste material in accordance with all local, regional, national, and international regulations.

## SECTION 14: TRANSPORT INFORMATION

**In Accordance With ICAO/IATA/DOT/TDG**

- 14.1. UN Number** Not regulated for transport
- 14.2. UN Proper Shipping Name** Not regulated for transport
- 14.3. Additional Information** Not regulated for transport

**Transport by Sea** Not regulated for transport

**Air Transport**

**DOT Quantity Limitations Cargo Aircraft** : kg  
Only (49 CFR 175.75)

## SECTION 15: REGULATORY INFORMATION

### US Federal Regulations

<b>Chromium (7440-47-3)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 %
<b>Nickel (7440-02-0)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
<b>RQ (Reportable Quantity, Section 304 of EPA's List of Lists):</b>	100 lb (only applicable if particles are < 100 µm)
<b>SARA Section 311/312 Hazard Classes</b>	Immediate (acute) health hazard Delayed (chronic) health hazard
<b>SARA Section 313 - Emission Reporting</b>	0.1 %
<b>Manganese (7439-96-5)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 %
<b>Molybdenum (7439-98-7)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Silicon (7440-21-3)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

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<b>Tungsten (7440-33-7)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Carbon (7440-44-0)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Aluminum (7429-90-5)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 311/312 Hazard Classes</b>	Fire hazard Reactive hazard
<b>SARA Section 313 - Emission Reporting</b>	1.0 % (dust or fume only)
<b>Antimony (7440-36-0)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 %
<b>Bismuth (7440-69-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Boron (7440-42-8)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Calcium (7440-70-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Copper (7440-50-8)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 %
<b>Iron (7439-89-6)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>SARA Section 311/312 Hazard Classes</b>	Fire hazard
<b>Magnesium (7439-95-4)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Niobium (7440-03-1)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Nitrogen (7727-37-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>SARA Section 311/312 Hazard Classes</b>	Immediate (acute) health hazard Sudden release of pressure hazard
<b>Phosphorus elemental (7723-14-0)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on the United States SARA Section 302	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 302 Threshold Planning Quantity (TPQ)</b>	100 (This material is a reactive solid. The TPQ does not default to 10000 pounds for non-powder, non-molten, non-solution form)
<b>SARA Section 313 - Emission Reporting</b>	1.0 % (yellow or white)
<b>Selenium (7782-49-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 %
<b>Sulfur (7704-34-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Tellurium (13494-80-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	



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<b>Tin (7440-31-5)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Titanium (7440-32-6)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Vanadium (7440-62-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 % (except when contained in an alloy)
<b>Zinc (7440-66-6)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
<b>SARA Section 313 - Emission Reporting</b>	1.0 % (dust or fume only)
<b>US State Regulations</b>	
<b>Carbon and Alloy Steels()</b>	
<b>U.S. - California - Proposition 65 - Carcinogens List</b>	WARNING: This product contains chemicals known to the State of California to cause cancer.
<b>Nickel (7440-02-0)</b>	
<b>U.S. - California - Proposition 65 - Carcinogens List</b>	WARNING: This product contains chemicals known to the State of California to cause cancer.

<b>Chromium (7440-47-3)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List	
U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances	
U.S. - Pennsylvania - RTK (Right to Know) List	
<b>Nickel (7440-02-0)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List	
U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances	
U.S. - Pennsylvania - RTK (Right to Know) List	
<b>Manganese (7439-96-5)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List	
U.S. - Pennsylvania - RTK (Right to Know) List	
<b>Molybdenum (7439-98-7)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) List	
<b>Silicon (7440-21-3)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) List	
<b>Tungsten (7440-33-7)</b>	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) List	

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<b>Aluminum (7429-90-5)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Antimony (7440-36-0)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Boron (7440-42-8)</b>
U.S. - New Jersey - Right to Know Hazardous Substance List
<b>Calcium (7440-70-2)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Copper (7440-50-8)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Magnesium (7439-95-4)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Nitrogen (7727-37-9)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Phosphorus elemental (7723-14-0)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Selenium (7782-49-2)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Sulfur (7704-34-9)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Tellurium (13494-80-9)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Tin (7440-31-5)</b>
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List

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U.S. - Pennsylvania - RTK (Right to Know) List
<b>Titanium (7440-32-6)</b>
U.S. - New Jersey - Right to Know Hazardous Substance List
<b>Vanadium (7440-62-2)</b>
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List
<b>Zinc (7440-66-6)</b>
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

### Canadian Regulations

<b>Carbon and Alloy Steels</b>	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Chromium (7440-47-3)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 0.1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Nickel (7440-02-0)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 0.1 %	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects
<b>Manganese (7439-96-5)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Molybdenum (7439-98-7)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Silicon (7440-21-3)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Tungsten (7440-33-7)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Carbon (7440-44-0)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

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<b>Aluminum (7429-90-5)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 6 - Reactive Flammable Material Class B Division 4 - Flammable Solid
<b>Antimony (7440-36-0)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects
<b>Bismuth (7440-69-9)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Boron (7440-42-8)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Calcium (7440-70-2)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 6 - Reactive Flammable Material Class E - Corrosive Material
<b>Copper (7440-50-8)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Iron (7439-89-6)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 4 - Flammable Solid Class B Division 6 - Reactive Flammable Material
<b>Magnesium (7439-95-4)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 4 - Flammable Solid Class B Division 6 - Reactive Flammable Material
<b>Niobium (7440-03-1)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 4 - Flammable Solid
<b>Nitrogen (7727-37-9)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class A - Compressed Gas
<b>Phosphorus elemental (7723-14-0)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 4 - Flammable Solid Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

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<b>Selenium (7782-49-2)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 0.1 %	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects
<b>Sulfur (7704-34-9)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects
<b>Tellurium (13494-80-9)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects
<b>Tin (7440-31-5)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Titanium (7440-32-6)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 4 - Flammable Solid
<b>Vanadium (7440-62-2)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Zinc (7440-66-6)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

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

**Revision Date** : 10/28/2015  
**Other Information** : 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:

Acute Tox. 1 (Oral)	Acute toxicity (oral) Category 1
Acute Tox. 2 (Dermal)	Acute toxicity (dermal) Category 2
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Aquatic Chronic 4	Hazardous to the aquatic environment - Chronic Hazard Category 4

# Carbon and Alloy Steels

## Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
Compressed gas	Gases under pressure Compressed gas
Flam. Sol. 1	Flammable solids Category 1
Repr. 1B	Reproductive toxicity Category 1B
Self-heat. 1	Self-heating substances and mixtures Category 1
Self-heat. 2	Self-heating substances and mixtures Category 2
Simple Asphy	Simple Asphyxiant
Skin Irrit. 2	Skin corrosion/irritation Category 2
Skin Sens. 1	Skin sensitization Category 1
Skin Sens. 1B	Skin sensitization Category 1B
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
Water-react. 2	Substances and mixtures which in contact with water emit flammable gases Category 2
H228	Flammable solid
	May form combustible dust concentrations in air
H251	Self-heating; may catch fire
H252	Self-heating in large quantities; may catch fire
H261	In contact with water releases flammable gases
H280	Contains gas under pressure; may explode if heated
H300	Fatal if swallowed
H301	Toxic if swallowed
H310	Fatal in contact with skin
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H331	Toxic if inhaled
H332	Harmful if inhaled
H351	Suspected of causing cancer
H360	May damage 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
H380	May displace oxygen and cause rapid suffocation
H400	Very toxic to aquatic life
H402	Harmful to aquatic life
H412	Harmful to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life

### Party Responsible for the Preparation of This Document

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*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.*

NA GHS SDS