

## Safety Data Sheet



## Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

### 1.1 Product identifier

**Product Name**

• **Nickel Based Alloys**

**Synonyms**

- 9XX; AIR (X); Airesist; Alloy (X); AMS (X); ASTM (X); B19XX; Blendalloy (x); BMS (X); C (X); C263; CHS (X); ChS(x); CMS (X); CW (X); DS(X); EEQ(X); EMS (X); G (X); GE (X); GMR (X); GTD (X); Hast(X); Hastelloy(X); Haynes (X); HR (X); HS (X); HU (X); HY (X); IN; IN (X); INCO (X); INCONEL (X); JA (X); JET (X); JN (X); MA (X); MAR M (X); MBF (X); ME(X); MFB (X); MGA(X); MIL (X); Mitsu(X); MM (X); MSRR (X); N(X); NC(X); Ni(X); NIBRAZ(X); Nickel (X); NiCr(X); Nimo(X); Nimonic (X); NUCALLOY(X); PD (x); PSM(X); PW(X); PWA (X); PWPS(X); Rene (X); RR(X); SA(X); SC (X); Siemet(X); SR (x); STAL (x); SX (x); TLV (X); TMS (x); TNG(X); TSN(X); U (X); Udimet (X); VZhL (x); WASP; Waspalloy (X); WG(X); X (X); YH(X); Z(X)

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

**Relevant identified use(s)**

- Cast ingots at varying weights and dimensions. Ingots are sold and distributed to downstream processors who remelt the superalloys into products used within aerospace, automotive and power generation turbine components.

### 1.3 Details of the supplier of the safety data sheet

**Manufacturer**

- Doncasters Group Technical Center  
36 Spring Lane  
Farmington, CT 06032  
United States

**Telephone (General)** • 860-677-1376

**Telephone (Technical)** • +44 (0) 1905 825500

### 1.4 Emergency telephone number

**Manufacturer**

- 800-262-8200 - CHEMTREC

**Manufacturer**

- +1-703-741-5500 - CHEMTREC

## Section 2: Hazards Identification

### EU/EEC

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 2015/830]

### 2.1 Classification of the substance or mixture

**CLP**

- Under normal conditions, exposure to cast ingots presents few health or physical hazards in itself. Thermal cutting and melting of ingots may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards. Dusts generated by cutting or grinding can present physical hazards.  
Skin Sensitization 1 - H317  
Respiratory Sensitization 1 - H334

Carcinogenicity 2 - H351  
 Reproductive Toxicity 2 - H361fd  
 Specific Target Organ Toxicity Repeated Exposure 1 - H372  
 Specific Target Organ Toxicity Repeated Exposure 2 - H373

## 2.2 Label Elements

CLP

### DANGER



- Hazard statements •**
- H317 - May cause an allergic skin reaction
  - H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
  - H351 - Suspected of causing cancer.
  - H361fd - Suspected of damaging fertility. Suspected of damaging the unborn child.
  - H372 - Causes damage to organs through prolonged or repeated exposure.
  - H373 - May cause damage to organs through prolonged or repeated exposure.

### Precautionary statements

- Prevention •**
- P201 - Obtain special instructions before use.
  - P202 - Do not handle until all safety precautions have been read and understood.
  - P260 - Do not breathe dust and/or fume.
  - P264 - Wash thoroughly after handling.
  - P270 - Do not eat, drink or smoke when using this product.
  - P272 - Contaminated work clothing should not be allowed out of the workplace.
  - P280 - Wear protective gloves/protective clothing/eye protection/face protection.
  - P284 - In case of inadequate ventilation wear respiratory protection.
- Response •**
- P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  - P342+P311 - If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
  - P302+P352 - IF ON SKIN: Wash with plenty of water.
  - P321 - Specific treatment, see supplemental first aid information.
  - P362+P364 - Take off contaminated clothing and wash it before reuse.
  - P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
  - P308+P313 - IF exposed or concerned: Get medical advice/attention.
  - P314 - Get medical advice/attention if you feel unwell.

- Storage/Disposal •**
- P405 - Store locked up.
  - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

## 2.3 Other Hazards

- CLP
- May form combustible dust concentrations in air. Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

## UN GHS Revision 3

According to: UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS): Third Revised Edition

### 2.1 Classification of the substance or mixture

UN GHS

- Under normal conditions, exposure to cast ingots presents few health or physical hazards in itself. Thermal cutting and melting of ingots may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards. Dusts generated by cutting or grinding can present physical hazards.
- Skin Sensitization 1  
 Eye Irritation 2

Respiratory Sensitization 1  
 Carcinogenicity 2  
 Reproductive Toxicity 2  
 Specific Target Organ Toxicity Repeated Exposure 1

## 2.2 Label elements

UN GHS

### DANGER



- Hazard statements**
- May cause an allergic skin reaction
  - Causes serious eye irritation
  - May cause allergy or asthma symptoms or breathing difficulties if inhaled
  - Suspected of causing cancer.
  - Suspected of damaging fertility or the unborn child.
  - Causes damage to organs through prolonged or repeated exposure.

### Precautionary statements

- Prevention**
- Obtain special instructions before use.
  - Do not handle until all safety precautions have been read and understood.
  - Do not breathe dust and/or fume.
  - Wash thoroughly after handling.
  - Do not eat, drink or smoke when using this product.
  - Contaminated work clothing should not be allowed out of the workplace.
  - Wear protective gloves/protective clothing/eye protection/face protection.
  - Use personal protective equipment as required.
  - In case of inadequate ventilation wear respiratory protection.
- Response**
- IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
  - Call a POISON CENTER or doctor/physician.
  - IF ON SKIN: Wash with plenty of soap and water.
  - Specific treatment, see supplemental first aid information.
  - Wash contaminated clothing before reuse.
  - If skin irritation or rash occurs: Get medical advice/attention.
  - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - If eye irritation persists: Get medical advice/attention.
  - IF exposed or concerned: Get medical advice/attention.
  - Get medical advice/attention if you feel unwell.
- Storage/Disposal**
- Store locked up.
  - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

## 2.3 Other hazards

UN GHS

- May form combustible dust concentrations in air.  
 Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.  
 According to the Globally Harmonized System for Classification and Labeling (GHS) this product is considered hazardous

## United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

## 2.1 Classification of the substance or mixture

OSHA HCS 2012

- Under normal conditions, exposure to cast ingots presents few health or physical hazards in itself. Thermal cutting and melting of ingots may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards. Dusts generated by cutting or grinding can present

physical hazards.  
 Skin Sensitization 1  
 Eye Irritation 2  
 Respiratory Sensitization 1  
 Carcinogenicity 2  
 Reproductive Toxicity 2  
 Specific Target Organ Toxicity Repeated Exposure 1  
 Combustible Dust  
 Hazards Not Otherwise Classified - Health Hazards - Metal fume fever

## 2.2 Label elements

### OSHA HCS 2012

#### DANGER



- Hazard statements**
- May cause an allergic skin reaction
  - Causes serious eye irritation
  - May cause allergy or asthma symptoms or breathing difficulties if inhaled
  - Suspected of causing cancer.
  - Suspected of damaging fertility or the unborn child.
  - Causes damage to organs through prolonged or repeated exposure.
  - May form combustible dust concentrations in air.

#### Precautionary statements

- Prevention**
- Obtain special instructions before use.
  - Do not handle until all safety precautions have been read and understood.
  - Do not breathe dust and/or fume.
  - Wash thoroughly after handling.
  - Do not eat, drink or smoke when using this product.
  - Contaminated work clothing should not be allowed out of the workplace.
  - Wear protective gloves/protective clothing/eye protection/face protection.
  - In case of inadequate ventilation wear respiratory protection.
- Response**
- IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
  - Call a POISON CENTER/doctor.
  - If on skin: Wash with plenty of water.
  - Specific treatment, see supplemental first aid information.
  - Wash contaminated clothing before reuse.
  - If skin irritation or rash occurs: Get medical advice/attention.
  - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - If eye irritation persists: Get medical advice/attention.
  - IF exposed or concerned: Get medical advice/attention.
  - Get medical advice/attention if you feel unwell.
- Storage/Disposal**
- Store locked up.
  - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

## 2.3 Other hazards

### OSHA HCS 2012

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

## Canada

According to: WHMIS 2015

## 2.1 Classification of the substance or mixture

**WHMIS 2015**

- Under normal conditions, exposure to cast ingots presents few health or physical hazards in itself. Thermal cutting and melting of ingots may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards. Dusts generated by cutting or grinding can present physical hazards.
- Skin Sensitization 1
- Eye Irritation 2
- Respiratory Sensitization 1
- Carcinogenicity 2
- Specific Target Organ Toxicity Repeated Exposure 1
- Reproductive Toxicity 2
- Combustible Dusts 1
- Health Hazards Not Otherwise Classified 1

**2.2 Label elements****WHMIS 2015****DANGER**

- Hazard statements**
- May cause an allergic skin reaction
  - Causes serious eye irritation
  - May cause allergy or asthma symptoms or breathing difficulties if inhaled
  - Suspected of causing cancer.
  - Suspected of damaging fertility or the unborn child.
  - Causes damage to organs through prolonged or repeated exposure.
  - May form combustible dust concentrations in air.
  - Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

**Precautionary statements**

- Prevention**
- Obtain special instructions before use.
  - Do not handle until all safety precautions have been read and understood.
  - Do not breathe dust or fume.
  - Wash thoroughly after handling.
  - Do not eat, drink or smoke when using this product.
  - Contaminated work clothing should not be allowed out of the workplace.
  - Wear protective gloves/protective clothing/eye protection/face protection.
  - In case of inadequate ventilation wear respiratory protection.
- Response**
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  - If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
  - IF ON SKIN: Wash with plenty of water.
  - Specific treatment, see supplemental first aid information.
  - Take off contaminated clothing and wash it before reuse.
  - If skin irritation or rash occurs: Get medical advice/attention.
  - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - If eye irritation persists: Get medical advice/attention.
  - IF exposed or concerned: Get medical advice/attention.
  - Get medical advice/attention if you feel unwell.
- Storage/Disposal**
- Store locked up.
  - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**2.3 Other hazards****WHMIS 2015**

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

## Section 3 - Composition/Information on Ingredients

### 3.1 Substances

- Material does not meet the criteria of a substance.

### 3.2 Mixtures

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Nickel, massive, ≥ 1 mm	<b>CAS:</b> 7440-02-0 <b>EC Number:</b> 231-111-4	45% TO 100%	NDA	<b>EU CLP:</b> Annex VI, Table 3.1: Skin Sens. 1, H317; Carc. 2, H351 (Inhl); STOT RE 1, H372 (Lungs / OrI/Dermal/Inhl); Aquatic Chronic 3, H412 <b>UN GHS Revision 3:</b> Flam. Sol. 1; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs / OrI, Inhl); Aquatic Acute 3; Aquatic Chronic 3 <b>OSHA HCS 2012:</b> Flam. Sol. 1; Comb. Dust; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs / OrI, Inhl) <b>WHMIS 2015:</b> Flam. Sol. 1; Comb. Dust; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs / OrI, Inhl)	NDA
Iron	<b>CAS:</b> 7439-89-6 <b>EC Number:</b> 231-096-4	0% TO 40%	NDA	<b>EU CLP:</b> Acute Tox. 4, H302; Aquatic Chronic 4, H413 <b>UN GHS Revision 3:</b> Acute Tox. 4 (OrI); Aquatic Chronic 4 <b>OSHA HCS 2012:</b> Acute Tox. 4 (OrI) <b>WHMIS 2015:</b> Acute Tox. 4 (OrI)	NDA
Cobalt (powder)	<b>CAS:</b> 7440-48-4 <b>EC Number:</b> 231-158-0 <b>EU Index:</b> 027-001-00-9	0% TO 25%	Ingestion/Oral-Rat LD50 • 6171 mg/kg	<b>EU CLP:</b> Annex VI, Table 3.1: Resp. Sens. 1, H334; Skin Sens. 1, H317; Aquatic Chronic 1, H410 (M=1) <b>UN GHS Revision 3:</b> Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl); Aquatic Acute 2; Aquatic Chronic 2 <b>OSHA HCS 2012:</b> Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl) <b>WHMIS 2015:</b> Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl)	NDA
Chromium, massive	<b>CAS:</b> 7440-47-3 <b>EC Number:</b> 231-157-5	0% TO 24%	NDA	<b>EU CLP:</b> Not Classified <b>UN GHS Revision 3:</b> Not Classified <b>OSHA HCS 2012:</b> Comb. Dust <b>WHMIS 2015:</b> Comb. Dust	NDA
Molybdenum (powder)	<b>CAS:</b> 7439-98-7 <b>EC Number:</b> 231-107-2	0% TO 20%	NDA	<b>EU CLP:</b> Flam. Sol. 1, H228; Repr. 2, H361 (OrI); Aquatic Chronic 4, H413 <b>UN GHS Revision 3:</b> Flam. Sol. 1; Repr. 2 (OrI); Aquatic Chronic 4 <b>OSHA HCS 2012:</b> Flam. Sol. 1; Comb. Dust; Repr. 2 (OrI) <b>WHMIS 2015:</b> Flam. Sol. 1; Comb. Dust; Repr. 2 (OrI)	NDA
Aluminum powder, stabilized	<b>CAS:</b> 7429-90-5 <b>EC Number:</b> 231-072-3	0% TO 18%	NDA	<b>EU CLP:</b> Annex VI, Table 3.1: Flam. Sol. 1, H228; Water-react. 2, H261 <b>UN GHS Revision 3:</b> Flam. Sol. 1; Water-react. 2; STOT RE 1 (Lungs / Inhl) <b>OSHA HCS 2012:</b> Flam. Sol. 1; Water-react. 2; Comb. Dust; STOT RE 1 (Lungs / Inhl) <b>WHMIS 2015:</b> Flam. Sol. 1; Water-react. 2; Comb. Dust; STOT RE 1 (Lungs / Inhl)	NDA
				<b>EU CLP:</b> Flam. Sol. 1, H228; Self-heat. 2, H252; Repr. 2,	

Tungsten, powder	<b>CAS:</b> 7440-33-7 <b>EC Number:</b> 231-143-9	0% TO 15%	NDA	H361fd (Orl); EUH029 <b>UN GHS Revision 3:</b> Flam. Sol. 1; Self-heat. 2; Repr. 2 (Orl) <b>OSHA HCS 2012:</b> Flam. Sol. 1; Self-heat. 2; Repr. 2 (Orl) <b>WHMIS 2015:</b> Flam. Sol. 1; Self-heat. 2; Repr. 2 (Orl)	NDA
Tantalum	<b>CAS:</b> 7440-25-7 <b>EC Number:</b> 231-135-5	0% TO 15%	NDA	<b>EU CLP:</b> Acute Tox. 4, H302 <b>UN GHS Revision 3:</b> Acute Tox. 4 (Orl) <b>OSHA HCS 2012:</b> Acute Tox. 4 (Orl); Comb. Dust <b>WHMIS 2015:</b> Acute Tox. 4 (Orl); Comb. Dust	NDA
Rhenium	<b>CAS:</b> 7440-15-5 <b>EINECS:</b> 231-124-5	0% TO 8%	NDA	<b>EU CLP:</b> Not Classified <b>UN GHS Revision 3:</b> Not Classified <b>OSHA HCS 2012:</b> Not Classified <b>WHMIS 2015:</b> Not Classified	NDA
Vanadium	<b>CAS:</b> 7440-62-2 <b>EC Number:</b> 231-171-1	0% TO 7%	NDA	<b>EU CLP:</b> Aquatic Chronic 3, H412 <b>UN GHS Revision 3:</b> Aquatic Acute 3; Aquatic Chronic 3 <b>OSHA HCS 2012:</b> Not Classified <b>WHMIS 2015:</b> Not Classified	NDA
Titanium, massive	<b>CAS:</b> 7440-32-6 <b>EINECS:</b> 231-142-3	0% TO 7%	NDA	<b>EU CLP:</b> Pyr. Sol. 1, H250 <b>UN GHS Revision 3:</b> Pyr. Sol. 1 <b>OSHA HCS 2012:</b> Pyr. Sol. 1; Comb. Dust <b>WHMIS 2015:</b> Pyr. Sol. 1; Comb. Dust	NDA
Ruthenium	<b>CAS:</b> 7440-18-8 <b>EINECS:</b> 231-127-1	0% TO 6%	NDA	<b>EU CLP:</b> Not Classified <b>UN GHS Revision 3:</b> Not Classified <b>OSHA HCS 2012:</b> Not Classified <b>WHMIS 2015:</b> Not Classified	NDA
Silicon	<b>CAS:</b> 7440-21-3 <b>EC Number:</b> 231-130-8	0% TO 5%	Ingestion/Oral-Rat LD50 • 3160 mg/kg	<b>EU CLP:</b> Flam. Sol. 2, H228 <b>UN GHS Revision 3:</b> Flam. Sol. 2; Acute Tox. 5 (Orl) <b>OSHA HCS 2012:</b> Flam. Sol. 2 <b>WHMIS 2015:</b> Flam. Sol. 2	NDA
Niobium	<b>CAS:</b> 7440-03-1 <b>EC Number:</b> 231-113-5	0% TO 4%	NDA	<b>EU CLP:</b> Not Classified <b>UN GHS Revision 3:</b> Not Classified <b>OSHA HCS 2012:</b> Not Classified <b>WHMIS 2015:</b> Not Classified	NDA
Boron	<b>CAS:</b> 7440-42-8 <b>EINECS:</b> 231-151-2	0% TO 4%	Ingestion/Oral-Rat LD50 • 650 mg/kg	<b>EU CLP:</b> Acute Tox. 4, H302 <b>UN GHS Revision 3:</b> Acute Tox. 4 (Orl) <b>OSHA HCS 2012:</b> Acute Tox. 4 (Orl) <b>WHMIS 2015:</b> Acute Tox. 4 (Orl)	NDA
Hafnium	<b>CAS:</b> 7440-58-6 <b>EINECS:</b> 231-166-4	0% TO 3%	NDA	<b>EU CLP:</b> Eye Irrit. 2, H319 <b>UN GHS Revision 3:</b> Eye Irrit. 2; Skin Irrit. 3 <b>OSHA HCS 2012:</b> Eye Irrit. 2; Comb. Dust <b>WHMIS 2015:</b> Eye Irrit. 2; Comb. Dust	NDA
Manganese (powder)	<b>CAS:</b> 7439-96-5 <b>EC Number:</b> 231-105-1	0% TO 2%	Ingestion/Oral-Rat LD50 • 9 g/kg	<b>EU CLP:</b> Flam. Sol. 2, H228; Eye Irrit. 2, H319; Repr. 2, H361 (Orl); STOT RE 1 (CNS, Lungs / Inhl), H372 <b>UN GHS Revision 3:</b> Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl) <b>OSHA HCS 2012:</b> Flam. Sol. 2; Comb. Dust; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs / Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever <b>WHMIS 2015:</b> Flam. Sol. 2; Comb. Dust; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs / Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever	NDA

See Section 16 for full text of H-statements.

## Section 4 - First Aid Measures

## 4.1 Description of first aid measures

- Inhalation**
- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.
- Skin**
- Wash skin with soap and water. If skin irritation occurs: Get medical advice/attention.
- Eye**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.
- Ingestion**
- Rinse mouth. Do not give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

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

- Refer to Section 11 - Toxicological Information.

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

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

## Section 5 - Firefighting Measures

### 5.1 Extinguishing media

- Suitable Extinguishing Media**
- Use dry powder extinguishing agent.

- Unsuitable Extinguishing Media**
- No data available

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

- Unusual Fire and Explosion Hazards**
- Metal powder dispersed in air may cause fire and explosion. Molten metal can ignite combustibles. Molten metal will react violently with water.

- Hazardous Combustion Products**
- No data available

### 5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

## Section 6 - Accidental Release Measures

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

- Personal Precautions**
- Ventilate enclosed areas. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

- Emergency Procedures**
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. Keep unauthorized personnel away.

### 6.2 Environmental precautions

- Avoid run off to waterways and sewers.

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

- Containment/Clean-up Measures**
- Avoid generating dust. Solid ingot material should be picked up and recycled. Where possible allow molten material to solidify naturally. Residue from cutting or grinding should be swept or vacuumed and placed in suitable containers.



Use clean nonsparking tools to collect material.

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. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).

## 6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

## Section 7 - Handling and Storage

### 7.1 Precautions for safe handling

#### Handling

- Under normal conditions, exposure to cast ingots presents few health hazards in itself. Thermal cutting and melting of ingots may produce fumes and dust containing the component elements which may present potentially significant health hazards. Nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, an extremely toxic gas. Use only with adequate ventilation. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Cobalt causes a dermatitis of the allergic sensitivity type at points in friction. Cobalt toxicity also results in a progressive diffuse, interstitial pneumonia with a non-productive cough, dyspnea on exertion, interstitial fibrosis and cell damage. Other workers have experienced a sensitized respiratory disease characterized by cough, wheezing and shortness of breath where upon removal from the environment, the symptoms subside. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe dust or fumes. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

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

#### Storage

- Keep away from incompatible materials.

### 7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

## Section 8 - Exposure Controls/Personal Protection

### 8.1 Control parameters

Exposure Limits/Guidelines						
	Result	ACGIH	Europe	NIOSH	OSHA	United Kingdom
Chromium, massive (7440-47-3)	TWAs	0.5 mg/m <sup>3</sup> TWA	2 mg/m <sup>3</sup> TWA	0.5 mg/m <sup>3</sup> TWA	1 mg/m <sup>3</sup> TWA	0.5 mg/m <sup>3</sup> TWA
	STELs	Not established	Not established	Not established	Not established	1.5 mg/m <sup>3</sup> STEL (calculated)
Manganese (powder)	STELs	Not established	Not established	3 mg/m <sup>3</sup> STEL	Not established	1.5 mg/m <sup>3</sup> STEL (calculated)
	TWAs	0.02 mg/m <sup>3</sup> TWA (respirable particulate matter); 0.1 mg/m <sup>3</sup> TWA (inhalable particulate matter)	Not established	1 mg/m <sup>3</sup> TWA (fume)	Not established	0.5 mg/m <sup>3</sup> TWA (as Mn)
	Ceilings	Not established	Not established	Not established	5 mg/m <sup>3</sup> Ceiling (fume)	Not established

Tantalum (7440-25-7)	STELs	Not established	Not established	10 mg/m3 STEL (dust)	Not established	10 mg/m3 STEL
	TWAs	Not established	Not established	5 mg/m3 TWA (dust)	5 mg/m3 TWA	5 mg/m3 TWA
Cobalt (powder) (7440-48-4)	STELs	Not established	Not established	Not established	Not established	0.3 mg/m3 STEL (calculated)
	TWAs	0.02 mg/m3 TWA	Not established	0.05 mg/m3 TWA (dust and fume)	0.1 mg/m3 TWA (dust and fume)	0.1 mg/m3 TWA
Aluminum powder, stabilized (7429-90-5)	STELs	Not established	Not established	Not established	Not established	30 mg/m3 STEL (calculated, inhalable dust); 12 mg/m3 STEL (calculated, respirable dust)
	TWAs	1 mg/m3 TWA (respirable particulate matter)	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (inhalable dust); 4 mg/m3 TWA (respirable dust)
Silicon (7440-21-3)	STELs	Not established	Not established	Not established	Not established	30 ppm STEL (calculated, inhalable dust); 12 mg/m3 STEL (calculated, respirable dust)
	TWAs	Not established	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (inhalable dust); 4 mg/m3 TWA (respirable dust)
Tungsten, powder (7440-33-7)	STELs	Not established	Not established	10 mg/m3 STEL	Not established	10 mg/m3 STEL
	TWAs	3 mg/m3 TWA (respirable particulate matter)	Not established	5 mg/m3 TWA	Not established	5 mg/m3 TWA
Vanadium (7440-62-2)	Ceilings	Not established	Not established	0.05 mg/m3 Ceiling (except Vanadium metal and Vanadium carbide, dust and fume, as V, 15 min)  <i>as Vanadium compounds</i>	0.5 mg/m3 Ceiling (respirable dust, as V2O5); 0.1 mg/m3 Ceiling (fume, as V2O5)	Not established
	STELs	Not established	Not established	3 mg/m3 STEL (listed under Ferrovandium dust)	Not established	Not established
	TWAs	Not established	Not established	1 mg/m3 TWA (listed under Ferrovandium dust)	Not established	Not established
Hafnium (7440-58-6)	TWAs	0.5 mg/m3 TWA	Not established	0.5 mg/m3 TWA	0.5 mg/m3 TWA	Not established
Molybdenum (powder) (7439-98-7)	TWAs	10 mg/m3 TWA (inhalable particulate matter); 3 mg/m3 TWA (respirable particulate matter)	Not established	Not established	Not established	Not established
Nickel, massive, ≥ 1 mm (7440-02-0)	STELs	Not established	Not established	Not established	Not established	1.5 mg/m3 STEL (calculated)
	TWAs	1.5 mg/m3 TWA (inhalable particulate matter)	Not established	0.015 mg/m3 TWA	1 mg/m3 TWA	0.5 mg/m3 TWA

## 8.2 Exposure controls

### Engineering Measures/Controls

- Use a local exhaust when cutting, grinding, welding, or melting. It is recommended that dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment). Use only appropriately classified electrical equipment.

### Personal Protective Equipment

#### Respiratory

- For limited exposure, use P95 or N95 respirator. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

#### Eye/Face

- Wear safety goggles.

#### Skin/Body

- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

### Environmental Exposure Controls

- Follow best practice for site management and disposal of waste.

#### Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

STEL = Short Term Exposure Limits are based on 15-minute exposures

NIOSH = National Institute of Occupational Safety and Health

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

OSHA = Occupational Safety and Health Administration

## Section 9 - Physical and Chemical Properties

### 9.1 Information on Basic Physical and Chemical Properties

<b>Material Description</b>			
Physical Form	Solid	Appearance/Description	Metallic gray solid with no odor.
Color	Metallic gray.	Odor	Odorless
Odor Threshold	Data lacking		
<b>General Properties</b>			
Boiling Point	Not relevant	Melting Point/Freezing Point	2700 °F(1482.2222 °C)
Decomposition Temperature	Not relevant	pH	Not relevant
Specific Gravity/Relative Density	= 8 Water=1	Water Solubility	Negligible < 0.1 %
Viscosity	Not relevant	Explosive Properties	Data lacking
Oxidizing Properties:	Not relevant.		
<b>Volatility</b>			
Vapor Pressure	Not relevant	Vapor Density	Not relevant
Evaporation Rate	Not relevant	VOC (Wt.)	0 %
VOC (Vol.)	0 %	Volatiles (Wt.)	0 %
Volatiles (Vol.)	0 %		
<b>Flammability</b>			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not relevant.		
<b>Environmental</b>			
Octanol/Water Partition coefficient	Data lacking		

### 9.2 Other Information

- No additional physical and chemical parameters noted.

## Section 10: Stability and Reactivity

### 10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

- Stable under normal temperatures and pressures.

### 10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

### 10.4 Conditions to avoid

- Avoid generating dust.

### 10.5 Incompatible materials

- Cast Ingot is stable at ordinary temperature, however, caution should be taken with acids, bases, and oxidizers. Molten metal will react violently with water.

### 10.6 Hazardous decomposition products

- Under normal conditions, exposure to cast ingots presents few health hazards in itself. Thermal cutting and melting of ingots may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards.

## Section 11 - Toxicological Information

### 11.1 Information on toxicological effects

		Components
Nickel, massive, $\geq 1$ mm (45% TO 100%)	7440-02-0	<b>Acute Toxicity:</b> Ingestion/Oral-Rat TDLo • 200 mg/kg; <i>Nutritional and Gross Metabolic:</i> Gross Metabolite Changes: <b>Weight loss or decreased weight gain</b> ; <i>Behavioral:</i> <b>Somnolence (general depressed activity)</b> ; <b>Multi-dose Toxicity:</b> Ingestion/Oral-Rat TDLo • 500 mg/kg 5 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration:</i> <b>Fibrosis, focal (pneumoconiosis)</b> ; <i>Related to Chronic Data:</i> <b>Death in the Other Multiple Dose data type field</b> ; Inhalation-Rabbit TCLo • 1 mg/m <sup>3</sup> 6 Hour(s) 13 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:</i> <b>Other changes</b> ; <i>Lungs, Thorax, or Respiration:</i> <b>Changes in lung weight</b> ; <i>Blood:</i> <b>Hemorrhage</b> ; Inhalation-Rat TCLo • 0.4 mg/m <sup>3</sup> 40 Week(s)-Intermittent; <i>Vascular:</i> <b>Thrombosis distant from injection site</b> ; <i>Lungs, Thorax, or Respiration:</i> <b>Other changes</b> ; <i>Related to Chronic Data:</i> <b>Death in the Other Multiple Dose data type field</b> ; <b>Reproductive:</b> Ingestion/Oral-Rat TDLo • 158 mg/kg (multigenerations); <i>Reproductive Effects:</i> <b>Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus)</b> ; <i>Reproductive Effects:</i> <b>Effects on Embryo or Fetus:Fetal death</b> ; <b>Tumorigen / Carcinogen:</b> Inhalation-Guinea Pig TCLo • 15 mg/m <sup>3</sup> 91 Week(s)-Intermittent; <i>Tumorigenic:</i> <b>Equivocal tumorigenic agent by RTECS criteria</b> ; <i>Lungs, Thorax, or Respiration:</i> <b>Tumors</b> ; <i>Lungs, Thorax, or Respiration:</i> <b>Bronchiogenic carcinoma</b>
Silicon (0% TO 5%)	7440-21-3	<b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 3160 mg/kg; <b>Irritation:</b> Eye-Rabbit • 3 mg • Mild irritation
Manganese (powder) (0% TO 2%)	7439-96-5	<b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 9 g/kg; Inhalation-Man TCLo • 2300 µg/m <sup>3</sup> ; <i>Brain and Coverings:</i> <b>Other degenerative changes</b> ; <i>Behavioral:</i> <b>Changes in motor activity (specific assay)</b> ; <i>Behavioral:</i> <b>Muscle weakness</b> ; <b>Irritation:</b> Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation; <b>Multi-dose Toxicity:</b> Inhalation-Human TCLo • 0.5 mg/m <sup>3</sup> 39 Week(s)-Intermittent; <i>Brain and Coverings:</i> <b>Other degenerative changes</b> ; <i>Peripheral Nerve and Sensation:</i> <b>Sensory change involving peripheral nerve</b> ; <i>Behavioral:</i> <b>Irritability</b> ; Inhalation-Mouse TCLo • 0.7 mg/m <sup>3</sup> 24 Hour(s) 22 Week(s)-Continuous; <i>Lungs, Thorax, or Respiration:</i> <b>Fibrosis (interstitial)</b> ; <i>Immunological Including Allergic:</i> <b>Decrease in cellular immune response</b> ; Inhalation-Rat TCLo • 0.3 mg/m <sup>3</sup> 5 Hour(s) 26 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:</i> <b>Fibrosis (interstitial)</b> ; <i>Immunological Including Allergic:</i> <b>Decrease in cellular immune response</b> ;

		<b>Reproductive:</b> Ingestion/Oral-Mouse TDLo • 322.5 mg/kg (43D male); <i>Reproductive Effects:Paternal Effects:Spermatogenesis</i> ; Ingestion/Oral-Rat TDLo • 50 mg/kg (20D post); <i>Reproductive Effects:Specific Developmental Abnormalities:Central nervous system</i> ; <i>Reproductive Effects:Effects on Newborn:Biochemical and metabolic</i> ; <i>Reproductive Effects:Effects on Newborn:Behavioral</i>
Cobalt (powder) (0% TO 25%)	7440-48-4	<b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 6171 mg/kg; <i>Behavioral:Somnolence (general depressed activity)</i> ; <i>Behavioral:Ataxia</i> ; <i>Gastrointestinal:Hypermotility, diarrhea</i> ; <b>Multi-dose Toxicity:</b> Inhalation-Rabbit TCLo • 10 mg/m <sup>3</sup> 2 Hour(s) 56 Day(s)-Intermittent; <i>Behavioral:Food intake (animal)</i> ; <i>Lungs, Thorax, or Respiration:Emphysema</i> ; <i>Liver:Fatty liver degeneration</i> ; Inhalation-Rat TCLo • 0.09 mg/m <sup>3</sup> 24 Hour(s) 8 Week(s)-Continuous; <i>Lungs, Thorax, or Respiration:Other changes</i> ; <i>Kidney, Ureter, and Bladder:Urine volume decreased</i> ; <i>Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Dehydrogenases</i> ; Inhalation-Rat TCLo • 2 mg/m <sup>3</sup> 4 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosing alveolitis</i>
Aluminum powder, stabilized (0% TO 18%)	7429-90-5	<b>Multi-dose Toxicity:</b> Inhalation-Man TCLo • 4 mg/m <sup>3</sup> 1 Year(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Cough</i> ; <i>Lungs, Thorax, or Respiration:Dyspnea</i> ; <i>Nutritional and Gross Metabolic:Gross Metabolite Changes:Weight loss or decreased weight gain</i> ; Inhalation-Rat TCLo • 206 mg/m <sup>3</sup> 5 Hour(s) 30 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis (interstitial)</i> ; <i>Endocrine:Hypoglycemia</i> ; <i>Blood:Changes in serum composition (e.g., TP, bilirubin cholesterol)</i>
Tungsten, powder (0% TO 15%)	7440-33-7	<b>Irritation:</b> Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation; <b>Reproductive:</b> Ingestion/Oral-Rat TDLo • 1160 µg/kg (30W pre/1-20D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i> ; Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); <i>Reproductive Effects:Effects on Fertility:Post-implantation mortality</i> ; <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i>
Tantalum (0% TO 15%)	7440-25-7	<b>Acute Toxicity:</b> Ingestion/Oral-Mouse LD50 • 595 mg/kg
Titanium, massive (0% TO 7%)	7440-32-6	<b>Reproductive:</b> Ingestion/Oral-Rat TDLo • 158 mg/kg (multigeneration); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus)</i> ; <i>Reproductive Effects:Effects on Embryo or Fetus:Fetal death</i>
Vanadium (0% TO 7%)	7440-62-2	<b>Multi-dose Toxicity:</b> Ingestion/Oral-Rat TDLo • 225 mg/kg 15 Day(s)-Continuous; <i>Nutritional and Gross Metabolic:Gross Metabolite Changes:Weight loss or decreased weight gain</i>
Iron (0% TO 40%)	7439-89-6	<b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 750 mg/kg; <i>Blood:Changes in serum composition (e.g., TP, bilirubin cholesterol)</i> ; <i>Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Transaminases</i> ; Ingestion/Oral-Child TDLo • 77 mg/kg; <i>Behavioral:Irritability</i> ; <i>Gastrointestinal:Nausea or vomiting</i> ; <i>Blood:Normocytic anemia</i> ; <b>Multi-dose Toxicity:</b> Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; <i>Liver:Tumors</i> ; <i>Tumorigenic:Active as anti-cancer agent</i> ; <i>Tumorigenic:Protects against induction of experimental tumors</i>
Boron (0% TO 4%)	7440-42-8	<b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 650 mg/kg; <b>Reproductive:</b> Ingestion/Oral-Rat TDLo • 4.95 mg/kg (1-22D preg); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus)</i> ; <i>Reproductive Effects:Effects on Embryo or Fetus:Fetal death</i>
Molybdenum (powder) (0% TO 20%)	7439-98-7	<b>Mutagen:</b> Cytogenetic analysis • Inhalation-Rat • 19500 µg/m <sup>3</sup> ; <b>Reproductive:</b> Ingestion/Oral-Mouse TDLo • 448 mg/kg (multigenerations); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus)</i> ; <i>Reproductive Effects:Effects on Embryo or Fetus:Fetal death</i> ; Ingestion/Oral-Rat TDLo • 5800 µg/kg (30W pre/1-20D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i> ; Ingestion/Oral-Rat TDLo • 6050 µg/kg (35W pre); <i>Reproductive Effects:Effects on Fertility:Pre-implantation mortality</i> ; <i>Reproductive Effects:Effects on Fertility:Post-implantation mortality</i> ; <i>Reproductive Effects:Specific Developmental Abnormalities:Musculoskeletal system</i>

GHS Properties	Classification
<b>Acute toxicity</b>	EU/CLP • Data lacking UN GHS 3 • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking

<b>Skin corrosion/Irritation</b>	EU/CLP • Data lacking UN GHS 3 • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
<b>Serious eye damage/Irritation</b>	EU/CLP • Data lacking UN GHS 3 • Eye Irritation 2 OSHA HCS 2012 • Eye Irritation 2 WHMIS 2015 • Eye Irritation 2
<b>Skin sensitization</b>	EU/CLP • Skin Sensitizer 1 UN GHS 3 • Skin Sensitizer 1 OSHA HCS 2012 • Skin Sensitizer 1 WHMIS 2015 • Skin Sensitizer 1
<b>Respiratory sensitization</b>	EU/CLP • Respiratory Sensitizer 1 UN GHS 3 • Respiratory Sensitizer 1 OSHA HCS 2012 • Respiratory Sensitizer 1 WHMIS 2015 • Respiratory Sensitizer 1
<b>Aspiration Hazard</b>	EU/CLP • Data lacking UN GHS 3 • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
<b>Carcinogenicity</b>	EU/CLP • Carcinogenicity 2 UN GHS 3 • Carcinogenicity 2 OSHA HCS 2012 • Carcinogenicity 2 WHMIS 2015 • Carcinogenicity 2
<b>Germ Cell Mutagenicity</b>	EU/CLP • Data lacking UN GHS 3 • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
<b>Toxicity for Reproduction</b>	EU/CLP • Toxic to Reproduction 2 UN GHS 3 • Toxic to Reproduction 2 OSHA HCS 2012 • Toxic to Reproduction 2 WHMIS 2015 • Toxic to Reproduction 2
<b>STOT-SE</b>	EU/CLP • Data lacking UN GHS 3 • Data lacking OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
<b>STOT-RE</b>	EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2 UN GHS 3 • Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1 WHMIS 2015 • Specific Target Organ Toxicity Repeated Exposure 1

## Potential Health Effects

### Inhalation

#### Acute (Immediate)

- Exposure to dust may cause irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible. Cobalt toxicity also results in a progressive diffuse, interstitial pneumonia with a non-productive cough, dyspnea on exertion, interstitial fibrosis and cell damage. Other workers have experienced a sensitized respiratory disease characterized by cough, wheezing and shortness of breath where upon removal from the environment, the

- Chronic (Delayed)**
- symptoms subside.
  - Chronic exposure to Nickel can cause effects such as rhinitis, sinusitis, nasal septal perforations and asthma have been reported in nickel refinery and nickel plating workers.
- Skin**
- Acute (Immediate)**
- Cobalt causes a dermatitis of the allergic sensitivity type at points in friction. Contact allergy to nickel is very common in human beings.
- Chronic (Delayed)**
- No data available.
- Eye**
- Acute (Immediate)**
- Causes serious eye irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.
- Chronic (Delayed)**
- No data available.
- Ingestion**
- Acute (Immediate)**
- Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.
- Chronic (Delayed)**
- No data available.
- Other**
- Chronic (Delayed)**
- Chronic exposure to Manganese dust and fumes can cause Manganism (Parkinson like disease).
- Carcinogenic Effects**
- Repeated and prolonged exposure to fumes and dust created in processing this product may cause cancer.

Carcinogenic Effects			
	CAS	IARC	NTP
Cobalt (powder)	7440-48-4	Group 2B-Possible Carcinogen	Not Listed
Nickel, massive, ≥ 1 mm	7440-02-0	Group 2B-Possible Carcinogen	Reasonably Anticipated to be Human Carcinogen

- Reproductive Effects**
- Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

## 11.2 Other information

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

### Key to abbreviations

LD = Lethal Dose  
 TC = Toxic Concentration  
 TD = Toxic Dose

## Section 12 - Ecological Information

### 12.1 Toxicity

Components		
Nickel, massive, ≥ 1 mm (45% TO 100%)	7440-02-0	<b>Aquatic Toxicity-Fish:</b> 96 Hour(s) LC50 <i>Oncorhynchus mykiss</i> (Rainbow Trout) 0.06 mg/L 28 Day(s) NOEC <i>Cyprinus carpio</i> (Common Carp) 0.0035 µg/L <b>Aquatic Toxicity-Crustacea:</b> 7 Day(s) NOEC <i>Americamysis bahia</i> (Opossum Shrimp) 0.213 mg/L <b>Aquatic Toxicity-Algae and Other Aquatic Plant(s):</b> 96 Hour(s) EC50 <i>Pseudokirchneriella subcapitata</i> (Green Algae) 0.233 mg/L
Cobalt (powder) (0% TO 25%)	7440-48-4	<b>Aquatic Toxicity-Fish:</b> 96 Hour(s) LC50 <i>Pimephales promelas</i> (Fathead Minnow) 3.4 mg/L <b>Aquatic Toxicity-Crustacea:</b> 48 Hour(s) LC50 <i>Daphnia magna</i> (Water Flea) 4.4 mg/L 28 Day(s) NOEC <i>Daphnia magna</i> (Water Flea) 0.0028 mg/L

Vanadium (0% TO 7%)	7440-62-2	<b>Aquatic Toxicity-Fish:</b> 96 Hour(s) LC50 <i>Pimephales promelas</i> (Fathead Minnow) 1.8 mg/L <b>Aquatic Toxicity-Crustacea:</b> 48 Hour(s) LC50 <i>Daphnia magna</i> (Water Flea) 1.55 mg/L 7 Day(s) NOEC <i>Daphnia magna</i> (Water Flea) 0.5 mg/L
Iron (0% TO 40%)	7439-89-6	<b>Aquatic Toxicity-Fish:</b> 96 Hour(s) LC50 <i>Mudskipper</i> ( <i>Periophthalmus waltoni</i> ) 0.00648 mg/L 7 Day(s) NOEC <i>Brown Trout</i> ( <i>Salmo trutta</i> ) 0.305 mg/L <b>Aquatic Toxicity-Crustacea:</b> 7 Day(s) NOEC <i>Aquatic Sowbug, Isopod</i> ( <i>Idotea balthica</i> ) 0.5 mg/L
Molybdenum (powder) (0% TO 20%)	7439-98-7	<b>Aquatic Toxicity-Fish:</b> 96 Hour(s) LC50 <i>Rainbow Trout</i> ( <i>Oncorhynchus mykiss</i> ) 800 mg/L <b>Aquatic Toxicity-Crustacea:</b> 48 Hour(s) LC50 <i>Daphnia magna</i> (Water Flea) >200 mg/L 28 Day(s) NOEC <i>Daphnia magna</i> (Water Flea) 0.67 mg/L

- The product is not expected to present an environmental hazard.

## 12.2 Persistence and degradability

- Material data lacking.

## 12.3 Bioaccumulative potential

- Material data lacking.

## 12.4 Mobility in Soil

- Material data lacking.

## 12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

## 12.6 Other adverse effects

- No studies have been found.

## Section 13 - Disposal Considerations

### 13.1 Waste treatment methods

#### Product waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

#### Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

## Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
TDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IMO/IMDG	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA
IATA/ICAO	Not Applicable	Not Regulated	Not Applicable	Not Applicable	NDA

#### 14.6 Special precautions for user

- None specified.

#### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

- Data lacking.

## Section 15 - Regulatory Information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or



**mixture****SARA Hazard Classifications** • Acute, Chronic, Pressure(Sudden Release of)

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Aluminum powder, stabilized	7429-90-5	Yes	No	Yes	No	Yes
Boron	7440-42-8	Yes	No	Yes	No	Yes
Chromium, massive	7440-47-3	Yes	No	Yes	No	Yes
Cobalt (powder)	7440-48-4	Yes	No	Yes	No	Yes
Hafnium	7440-58-6	Yes	No	Yes	No	Yes
Iron	7439-89-6	Yes	No	Yes	No	Yes
Manganese (powder)	7439-96-5	Yes	No	Yes	No	Yes
Molybdenum (powder)	7439-98-7	Yes	No	Yes	No	Yes
Nickel, massive, ≥ 1 mm	7440-02-0	Yes	No	Yes	No	Yes
Niobium	7440-03-1	Yes	No	Yes	No	Yes
Rhenium	7440-15-5	Yes	No	Yes	No	Yes
Ruthenium	7440-18-8	Yes	No	Yes	No	Yes
Silicon	7440-21-3	Yes	No	Yes	No	Yes
Tantalum	7440-25-7	Yes	No	Yes	No	Yes
Titanium, massive	7440-32-6	Yes	No	Yes	No	Yes
Tungsten, powder	7440-33-7	Yes	No	Yes	No	Yes
Vanadium	7440-62-2	Yes	No	Yes	No	Yes

**Canada****Labor****Canada - WHMIS 1988 - Classifications of Substances**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Uncontrolled product according to WHMIS classification criteria
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Uncontrolled product according to WHMIS classification criteria
• Manganese (powder)	7439-96-5	D2A; B4, D2A (powder)
• Tantalum	7440-25-7	Uncontrolled product according to WHMIS classification criteria
• Cobalt (powder)	7440-48-4	D2A, D2B
• Aluminum powder, stabilized	7429-90-5	B6 (powder); Uncontrolled product according to WHMIS classification criteria
• Molybdenum (powder)	7439-98-7	Uncontrolled product according to WHMIS classification criteria
• Nickel, massive, ≥ 1 mm	7440-02-0	D2A, D2B; B6, D2A (Raney)
• Silicon	7440-21-3	B4

• Tungsten, powder	7440-33-7	Uncontrolled product according to WHMIS classification criteria
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Uncontrolled product according to WHMIS classification criteria
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**Canada - WHMIS 1988 - Ingredient Disclosure List**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	1 %
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	0.1 %
• Manganese (powder)	7439-96-5	1 %
• Tantalum	7440-25-7	1 %
• Cobalt (powder)	7440-48-4	0.1 %
• Aluminum powder, stabilized	7429-90-5	1 %
• Molybdenum (powder)	7439-98-7	1 %
• Nickel, massive, ≥ 1 mm	7440-02-0	0.1 %
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	1 %
• Vanadium	7440-62-2	1 %
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**Environment****Canada - CEPA - Priority Substances List**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**United States****Labor****U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals**

• Ruthenium	7440-18-8	Not Listed
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• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - OSHA - Specifically Regulated Chemicals**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**Environment****U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed

• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed
<b>U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities</b>		
• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
		5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Chromium, massive	7440-47-3	
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
		100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Nickel, massive, ≥ 1 mm	7440-02-0	
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed
<b>U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities</b>		
• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed

• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - CERCLA/SARA - Section 313 - Emission Reporting**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	1.0 % de minimis concentration
• Manganese (powder)	7439-96-5	1.0 % de minimis concentration
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	0.1 % de minimis concentration
		1.0 % de minimis

• Aluminum powder, stabilized	7429-90-5	concentration (dust or fume only)
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	0.1 % de minimis concentration
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	1.0 % de minimis concentration (except when contained in an alloy)
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**United States - California****Environment****U.S. - California - Proposition 65 - Carcinogens List**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	carcinogen, 7/1/1992 (powder)
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	carcinogen, 10/1/1989 (metallic)
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed

• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - California - Proposition 65 - Developmental Toxicity**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, ≥ 1 mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed

• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - California - Proposition 65 - Reproductive Toxicity - Female**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, $\geq 1$ mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**U.S. - California - Proposition 65 - Reproductive Toxicity - Male**

• Ruthenium	7440-18-8	Not Listed
• Hafnium	7440-58-6	Not Listed
• Rhenium	7440-15-5	Not Listed
• Chromium, massive	7440-47-3	Not Listed
• Manganese (powder)	7439-96-5	Not Listed
• Tantalum	7440-25-7	Not Listed
• Cobalt (powder)	7440-48-4	Not Listed
• Aluminum powder, stabilized	7429-90-5	Not Listed
• Molybdenum (powder)	7439-98-7	Not Listed
• Nickel, massive, $\geq 1$ mm	7440-02-0	Not Listed
• Silicon	7440-21-3	Not Listed
• Tungsten, powder	7440-33-7	Not Listed
• Vanadium	7440-62-2	Not Listed
• Iron	7439-89-6	Not Listed
• Titanium, massive	7440-32-6	Not Listed
• Niobium	7440-03-1	Not Listed
• Boron	7440-42-8	Not Listed

**15.2 Chemical Safety Assessment**

- No Chemical Safety Assessment has been carried out.

**15.3 Other Information**

- WARNING: This product contains a chemical known to the State of California to cause cancer.

**Section 16 - Other Information**



**Relevant Phrases (code & full text)**

- H228 - Flammable solid
- H250 - Catches fire spontaneously if exposed to air
- H252 - Self-heating in large quantities; may catch fire
- H261 - In contact with water releases flammable gas
- H302 - Harmful if swallowed
- H319 - Causes serious eye irritation
- H361 - Suspected of damaging fertility or the unborn child.
- H410 - Very toxic to aquatic life with long lasting effects
- H412 - Harmful to aquatic life with long lasting effects
- H413 - May cause long lasting harmful effects to aquatic life
- EUH029 - Contact with water liberates toxic gas.

**Revision Date**

- 08/March/2018

**Preparation Date**

- 08/April/2015

**Other Information**

- To access SDS online, go to [Doncasters.com/EHS/SDS](http://Doncasters.com/EHS/SDS).

**Disclaimer/Statement of Liability**

- The information herein is given in good faith but no warranty, expressed or implied, is made.

**Key to abbreviations**

NDA = No Data Available