

Safety Data Sheet

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

1.1 Product Identifier:

Product Name: Monel Based Alloys

Synonyms (X) Monel; CuNi; Monel (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 various downstream applications.

1.3 Details of the supplier of the safety data sheet:

Manufacturer: Ross & Catherall.
Forge Lane,
Killamarsh,
Sheffield,
S21 1BA
UK

Telephone (General): +44 (0) 114 248 6404 ext 345

Telephone (Direct Dial): +44 (0) 7990 442080

1.4 Emergency telephone number:

Manufacturer: +44 (0) 114 248 6404

Section 2: Hazards Identification

EU/EEC:

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 2022/586]

2.1 Classification of the substance or mixture:

CLP: Skin Sensitisation 1 - H317
Respiratory Sensitisation 1 - H334
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
Carcinogenicity 2 - H351
Reproductive Toxicity 1B - H360D
Specific Target Organ Toxicity Single Exposure 1 - H370
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
H335 - May cause respiratory irritation
H351 - Suspected of causing cancer.
H360D - May damage the unborn child.
H370 - Causes damage to organs.

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 or fume.
 P264 - Wash thoroughly after handling.
 P270 - Do not eat, drink or smoke when using this product.
 P271 - Use only outdoors or in a well-ventilated area.
 P272 - Contaminated work clothing should not be allowed out of the workplace.
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Response

P284 - In case of inadequate ventilation wear respiratory protection.
 P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P312 - Call Medical Services/doctor if you feel unwell.
 P342+P311 - If experiencing respiratory symptoms: Call Medical services.
 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.
 P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P337+P317 - If eye irritation persists: 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

P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
 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.

United Kingdom (UK):

According to: Regulation (UK) No 2015/21 (CLP)/REACH 2021/904 Excluding Northern Ireland (NI)

Note: Under the Post Brexit Northern Ireland Protocol, EU CLP and REACH regulations apply to NI.

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 The symptoms are shivering, fever, malaise, and muscular pain.
 According to Regulation (UK) No. 2015/21 (CLP) this material is considered hazardous.

United Nations (UN) GHS Revision 9E:

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

2.1 Classification of the substance or mixture:

UN GHS:

Skin Sensitisation 1 - H317
 Respiratory Sensitisation 1 - H334
 Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
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Label Elements:

UN GHS:

DANGER



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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 Labelling (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: Skin Sensitisation 1 - H317
Respiratory Sensitisation 1 - H334
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
Carcinogenicity 2 - H351
Reproductive Toxicity 1B - H360D
Specific Target Organ Toxicity Single Exposure 1 - H370
Specific Target Organ Toxicity Repeated Exposure 1 - H372
Specific Target Organ Toxicity Repeated Exposure 2 - H373
Combustible Dust
Hazards Not Otherwise Classified - Health Hazards - Metal fume fever

2.2 Label Elements:

OSHA HCS 2012:

DANGER



Hazard statements

H317 - May cause an allergic skin reaction
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H351 - Suspected of causing cancer.
H360D - May damage the unborn child.
H370 - Causes damage to organs.
H372 - Causes damage to organs through prolonged or repeated exposure.
H373 - May cause damage to organs through prolonged or repeated exposure.
Not Coded - May form combustible dust concentrations in air.

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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.

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,	CAS: 7440-02-0 EC Number: 231-111-4	25% TO 70%	NDA	EU CLP: Annex VI, Table 3.1: Skin Sens. 1, H317; Carc. 2, H351 (Inhl); STOT RE 1, H372 (Lungs / Orl/Dermal/Inhl); Aquatic Chronic 3, H412 UK CLP: MCL: Skin Sens. 1, H317; Carc. 2, H351 (Inhl); STOT RE 1, H372 (Lungs / Orl/Dermal/Inhl); Aquatic Chronic 3, H412 UN GHS Revision 9: Flam. Sol. 1; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs / Orl, Inhl); Aquatic Acute 3; Aquatic Chronic 3 OSHA HCS 2012: Flam. Sol. 1; Comb. Dust; Resp. Sens. 1B; Skin Sens. 1A; Carc. 2 (Inhl); STOT RE 2 (Lungs / Orl, Inhl)	NDA
Copper	CAS: 7440-50-8 EC Number: 231-159-6	20% TO 70%	NDA	EU CLP: Repr. 1B, H360D (Orl); STOT SE 1, H370 (Kidney, Orl); STOT SE 3: Resp. Irrit., H335; STOT RE 2, H373 (Liver, Orl); Aquatic Acute 1, H400 (M=100); Aquatic Chronic 1, H410 (M=10) UK CLP: Repr. 1B, H360D (Orl); STOT SE 1, H370 (Kidney, Orl); STOT SE 3: Resp. Irrit., H335; STOT RE 2, H373 (Liver, Orl); Aquatic Acute 1, H400 (M=100); Aquatic Chronic 1, H410 (M=10) UN GHS Revision 9: Repr. 1B (Orl); STOT SE 1 (Kidney, Orl); STOT SE 3: Resp. Irrit.;	

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				STOT RE 2 (Liver, Orl); Aquatic Acute 1 (M=100); Aquatic Chronic 1 (M=10) OSHA HCS 2012: Comb. Dust; Repr. 1B (Orl); STOT SE 1 (Kidney, Orl); STOT SE 3: Resp. Irrit.; STOT RE 2 (Liver, Orl); Hazard Not Otherwise Classified - Health Hazard - Metal Fume Fever	
Silicon	CAS: 7440-21-3 EC Number: 231-130-8	0% TO 8%	Ingestion/Oral- Rat LD50 • 3160 mg/kg	EU CLP: Flam. Sol. 2, H228 UK CLP: Flam. Sol. 2, H228 UN GHS Revision 9: Flam. Sol. 2; Acute Tox. 5 (Orl) OSHA HCS 2012: Flam. Sol. 2	NDA
Iron	CAS: 7439-89-6 EC Number: 231-096-4	0% TO 5%	NDA	EU CLP: Acute Tox. 4, H302; Aquatic Chronic 4, H413 UK CLP: Acute Tox. 4, H302; Aquatic Chronic 4, H413 UN GHS Revision 9: Acute Tox. 4 (Orl); Aquatic Chronic 4 OSHA HCS 2012: Acute Tox. 4 (Orl)	NDA
Aluminium	CAS: 7429-90-5 EC Number: 231-072-3	0% TO 5%	NDA	EU CLP: Annex VI, Table 3.1: Flam. Sol. 1, H228; Water -react. 2, H261 UK CLP: Flam. Sol. 1, H228; Water -react. 2, H261 UN GHS Revision 9: Flam. Sol. 1; Water-react. 2; STOT RE 1 (Lungs / Inhl); OSHA HCS 2012: Flam. Sol. 1; Water-react. 2; Comb. Dust; STOT RE 1 (Lungs / Inhl)	NDA
Manganese	CAS: 7439-96-5 EC Number: 231-105-1	0% TO 2%	Ingestion/Oral- Rat LD50 • 9 g/kg	EU CLP: Flam. Sol. 2, H228; Eye Irrit. 2, H319; Repr. 2, H361 (Orl); STOT RE 1 (CNS, Lungs / Inhl) UK CLP: Flam. Sol. 2, H228; Eye Irrit. 2, H319; Repr. 2, H361 (Orl); STOT RE 1 (CNS, Lungs / Inhl) UN GHS Revision 9: Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl) OSHA HCS 2012: Flam. Sol. 2; Skin Irrit. 3; Eye Irrit. 2; Repr. 2 (Orl); STOT RE 1 (CNS, Lungs/ Inhl); Hazard Not Otherwise Classified - Health Hazard - Metal fume fever	NDA
Cobalt (powder)	CAS: 7440-48-4 EC Number: 231-158-0 EU Index: 027-001-00-9	0% TO 2%	Ingestion/Oral- Rat LD50 • 6171 mg/kg	EU CLP: Annex VI, Table 3.1: Resp. Sens. 1, H334; Skin Sens. 1, H317; Aquatic Chronic 1, H410 (M=1) UK CLP: MCL: Resp. Sens. 1, H334; Skin Sens. 1, H317; Aquatic Chronic 1, H410 (M=1) UN GHS Revision 9: Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl); Aquatic Acute 2; Aquatic Chronic 2 OSHA HCS 2012: Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; Carc. 2 (Inhl); STOT RE 2 (Lung / Inhl)	NDA
Chromium	CAS: 7440-47-3 EC Number: 231-157-5	0% TO 0.5%	NDA	EU CLP: Not Classified UK CLP: Not Classified UN GHS Revision 9: Not Classified OSHA HCS 2012: Comb. Dust	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 Medical Personnel:	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.
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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. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Molten metal can ignite combustibles.

Hazardous Combustion Products Molten metal will react violently with water. 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 unauthorised personnel away.

6.2 Environmental precautions:

Avoid run off to waterways and sewers.

6.3 Methods and material for containment and cleaning up:

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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 non sparking 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, dyspnoea 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:

Store in a well-ventilated place. Keep container tightly closed. 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 (7440-47-3)	TWAs	0.5 mg/m ³ TWA	2 mg/m ³ TWA	0.5 mg/m ³ TWA	1 mg/m ³ TWA	0.5 mg/m ³ TWA 0.025 mg/m ³ (process generated)
	STELs	Not established	Not established	Not established	Not established	Not Stated EH40

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Manganese (7439-96-5)	STELs	Not established	Not established	3 mg/m ³ STEL	Not established	Not Stated EH 40
	TWAs	0.02 mg/m ³ TWA (respirable fraction). 0.1 mg/m ³ TWA (inhalable fraction)	Not established	1 mg/m ³ TWA (fume)	Not established	0.2 mg/m ³ TWA (as Mn) (Inhalable) 0.05 mg/m ³ TWA (as Mn) (respirable)
	Ceilings	Not established	Not established	Not established	5 mg/m ³ Ceiling (fume)	Not established
Cobalt (powder) (7440-48-4)	STELs	Not established	Not established	Not established	Not established	Not Stated EH40
	TWAs	0.02 mg/m ³ TWA	Not established	0.05 mg/m ³ TWA (dust and fume)	0.1 mg/m ³ TWA (dust and fume)	0.1 mg/m ³ TWA
Aluminium (7429-90-5)	STELs	Not established	Not established	Not established	Not established	Not Stated EH 40
	TWAs	1 mg/m ³ TWA (respirable fraction)	Not established	10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable dust)	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)	10 mg/m ³ TWA (inhalable dust); 4 mg/m ³ TWA (respirable dust)
Silicon (7440-21-3)	STELs	Not established	Not established	Not established	Not established	Not Stated EH40
	TWAs	Not established	Not established	10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable dust)	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)	10 mg/m ³ TWA (inhalable dust); 4 mg/m ³ TWA (respirable dust)
	TWAs	Not established	Not established	1 mg/m ³ TWA (listed under Ferrovandium dust)	Not established	Not established
Copper (7440-50-8)	TWAs	0.2 mg/m ³ TWA (fume)	Not established	1 mg/m ³ TWA (dust and mist); 0.1 mg/m ³ TWA (fume)	0.1 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist)	1 mg/m ³ TWA (dust and mists); 0.2 mg/m ³ TWA (fume)
	STELs	Not established	Not established	Not established	Not established	0.6 mg/m ³ STEL (calculated, fume); 2 mg/m ³ STEL (dust and mist)
Nickel, (7440-02-0)	STELs	Not established	Not established	Not established	Not established	1.5 mg/m ³ STEL (calculated)
	TWAs	1.5 mg/m ³ TWA (inhalable fraction)	Not established	0.015 mg/m ³ TWA	1 mg/m ³ TWA	0.5 mg/m ³ 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 respirators if exposure limits are exceeded or symptoms are experienced.

Eye/Face Skin/Body

Wear safety goggles.

Environmental Exposure Controls

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

Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

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Key to abbreviations:

ACGIH = American Conference of Governmental Industrial Hygiene
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9: Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties:

Material Description

Physical Form	Solid	Appearance/Description	Metallic grey solid with no odour.
Colour	Metallic grey.	Odour	Odourless
Odour Threshold	Data lacking		

General Properties

Boiling Point	Data lacking	Melting Point/Freezing Point	2700 °F (1482.2222 °C)
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	= 8 Water=1	Water Solubility	Negligible < 0.1 %
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		

Volatility

Vapour Pressure	Data lacking	Vapour Density	Data lacking
Evaporation Rate	Data lacking	Volatiles (Wt.)	0 %
Volatiles (Vol.)	0 %		

Flammability

Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		

Environmental

Octanol/Water Partition coefficient	Data lacking		
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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

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Components		
Nickel, (25% TO 70%)	7440-02-0	Acute Toxicity: Ingestion/Oral-Rat TDLo • 200 mg/kg; Nutritional and Gross Metabolic: Gross Metabolite Changes: Weight loss or decreased weight gain ; Behavioural: Somnolence (general depressed activity) ; Multi-dose Toxicity: Ingestion/Oral-Rat TDLo 500 mg/kg 5 Day(s)-Intermittent; Lungs, Thorax, or Respiration: Fibrosis, focal (pneumoconiosis) ; Related to Chronic Data: Death in the Other Multiple Dose data type field ; Inhalation-Rabbit TClO • 1 mg/m ³ 6 Hour(s) 13 Week(s)-Intermittent; Lungs, Thorax, or Respiration: Other changes ; Lungs, Thorax, or Respiration: Changes in lung weight ; Blood: Haemorrhage ; Inhalation-Rat TClO • 0.4 mg/m ³ 40 Week(s)-Intermittent; Vascular: Thrombosis distant from injection site ; Lungs, Thorax, or Respiration: Other changes ; Related to Chronic Data: Death in the Other Multiple Dose data type field ; Reproductive: Ingestion/Oral-Rat TDLo • 158 mg/kg (multigeneration); Reproductive Effects: Effects on Embryo or Foetus: Fetotoxicity (except death, e.g., stunted foetus) ; Reproductive Effects: Effects on Embryo or Foetus: Foetal death ; Tumorigenic / Carcinogen: Inhalation-Guinea Pig TClO • 15 mg/m ³ 91 Week(s)-Intermittent; Tumorigenic: Equivocal tumorigenic agent by RTECS criteria ; Lungs, Thorax, or Respiration: Tumours ; Lungs, Thorax, or Respiration: Bronchogenic carcinoma
Manganese (powder) (0% TO 2%)	7439-96-5	Acute Toxicity: Ingestion/Oral-Rat LD50 • 9 g/kg; Irritation: Eye-Rabbit • 500 mg 24 Hour(s) • Mild irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Mild irritation. Multi-dose Toxicity: Inhalation-Human TClO • 0.5 mg/m ³ 39 Week(s)-Intermittent; Brain and Coverings: Other degenerative changes ; Peripheral Nerve and Sensation: Sensory change involving peripheral nerve ; Behavioural: Irritability ; Inhalation-Mouse TClO • 0.7 mg/m ³ 24 Hour(s) 22 Week(s)-Continuous; Lungs, Thorax, or Respiration: Fibrosis (interstitial) ; Immunological Including Allergic: Decrease in cellular immune response ; Inhalation-Rat TClO • 0.3 mg/m ³ 5 Hour(s) 26 Week(s)-Intermittent; Lungs, Thorax, or Respiration: Fibrosis (interstitial) ; Immunological Including Allergic: Decrease in cellular immune response ; Reproductive: Ingestion/Oral-Mouse TDLo • 322.5 mg/kg (43D male); Reproductive Effects: Paternal Effects: Spermatogenesis ; Ingestion/Oral-Rat TDLo • 50 mg/kg (20D post); Reproductive Effects: Specific Developmental Abnormalities: Central nervous system ; Reproductive Effects: Effects on New-born: Biochemical and metabolic ; Reproductive Effects: Effects on New-born: Behavioural ; Ingestion/Oral-Rat TDLo • 90 mg/kg (18D post); Reproductive Effects: Effects on New-born: Growth statistics (e.g., reduced weight gain) ; Reproductive Effects: Effects on New-born: Biochemical and metabolic ; Reproductive Effects: Effects on New-born: Other postnatal measures or effects not listed.
Aluminium (0% TO 5%)	7429-90-5	Multi-dose Toxicity: Inhalation-Man TClO • 4 mg/m ³ 1 Year(s)-Intermittent; Lungs, Thorax, or Respiration: Cough ; Lungs, Thorax, or Respiration: Dyspnoea ; Nutritional and Gross Metabolic: Gross Metabolite Changes: Weight loss or decreased weight gain ; Inhalation-Rat TClO • 206 mg/m ³ 5 Hour(s) 30 Day(s)-Intermittent; Lungs, Thorax, or Respiration: Fibrosis (interstitial) ; Endocrine: Hypoglycaemia ; Blood: Changes in serum composition (e.g., TP, bilirubin cholesterol)
Silicon (0% TO 8%)	7440-21-3	Acute Toxicity: Ingestion/Oral-Rat LD50 • 3160 mg/kg. Irritation: Eye-Rabbit • 3 mg • Mild irritation
Cobalt (powder) (0% TO 2%)	7440-48-4	Acute Toxicity: Ingestion/Oral-Rat LD50 • 6171 mg/kg; behavioural: Somnolence (general depressed activity) ; behavioural: Ataxia ; Gastrointestinal: Hypermotility, diarrhoea . Multi-dose Toxicity: Inhalation-Rabbit TClO • 10 mg/m ³ 2 Hour(s) 56 Day(s)-Intermittent; behavioural: Food intake (animal) ; Lungs, Thorax, or Respiration: Emphysema ; Liver: Fatty liver degeneration ; Inhalation-Rat TClO • 0.09 mg/m ³ 24 Hour(s) 8 Week(s)-Continuous; Lungs, Thorax, or Respiration: Other changes ; Kidney, Ureter, and Bladder: Urine volume decreased ; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: Dehydrogenases ; Inhalation-Rat TClO • 2 mg/m ³ 4 Day(s)-Intermittent; Lungs, Thorax, or Respiration: Fibrosing alveolitis
Copper (20% TO 70%)	7440-50-8	Acute Toxicity: Ingestion/Oral-Mouse TDLo • 108 mg/kg; Behavioural: Tremor ; Gastrointestinal: Hypermotility, diarrhoea ; Gastrointestinal: Nausea or vomiting ; Ingestion/Oral-Mouse TDLo • 158 mg/kg; Kidney, Ureter, and Bladder: Changes in tubules (including acute renal failure, acute tubular necrosis) ; Ingestion/Oral-Mouse TDLo • 232 mg/kg; Kidney, Ureter, and Bladder: Changes primarily in glomeruli ; Blood: Changes in spleen ; Blood: Changes in serum composition (e.g., TP, bilirubin cholesterol) ; Multi-dose Toxicity: Ingestion/Oral-Rabbit TDLo • 3 g/kg 60 Day(s)-Continuous; Cardiac: Other changes ; Liver: Hepatitis (hepatocellular necrosis), zonal ; Related to Chronic Data: Death in the Other Multiple Dose data type field ; Reproductive: Ingestion/Oral-Rat TDLo • 1520 µg/kg (22W pre); Reproductive Effects: Specific Developmental Abnormalities: Musculoskeletal system ; Ingestion/Oral-Rat TDLo • 152 mg/kg (22W pre); Reproductive Effects: Effects on Embryo or Foetus: Fetotoxicity (except death, e.g., stunted foetus) ; Reproductive Effects: Specific Developmental Abnormalities: Central nervous system ; Ingestion/Oral-Rat TDLo • 1210 µg/kg (35W pre); Reproductive Effects: Effects on Fertility: Pre-implantation mortality ; Reproductive Effects: Effects on Fertility: Post-implantation mortality ; Tumorigenic / Carcinogen: Ingestion/Oral-Mouse TDLo •

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		10.08 mg/kg 12 Week(s)-Continuous; Tumorigenic: Carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: Other changes
Iron (0% TO 5%)	7439-89-6	Acute Toxicity: Ingestion/Oral-Rat LD50 • 750 mg/kg; Blood: Changes in serum composition (e.g., TP, bilirubin cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: Transaminases; Ingestion/Oral-Child TDLo • 77 mg/kg; behavioural: Irritability; Gastrointestinal: Nausea or vomiting; Blood: Normocytic anaemia. Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 105 mg/kg 5 Week(s)-Continuous; Liver: Tumours; Tumorigenic: Active as anti-cancer agent; Tumorigenic: Protects against induction of experimental tumours

GHS Properties	Classification
Acute toxicity	EU/CLP • Data lacking UK CLP • Data lacking UN GHS 9 • Data lacking OSHA HCS 2012 • Data lacking
Skin corrosion/Irritation	EU/CLP • Data lacking UK CLP • Data lacking UN GHS 9 • Data lacking OSHA HCS 2012 • Data lacking
Serious eye damage/Irritation	EU/CLP • Data lacking UK CLP • Data lacking UN GHS 9 • Data lacking OSHA HCS 2012 • Data lacking
Skin sensitisation	EU/CLP • Skin Sensitiser 1 UK CLP • Skin Sensitiser 1 UN GHS 9 • Skin Sensitiser 1 OSHA HCS 2012 • Skin Sensitiser 1
Respiratory sensitisation	EU/CLP • Respiratory Sensitiser 1 UK CLP • Respiratory Sensitiser 1 UN GHS 9 • Respiratory Sensitiser 1 OSHA HCS 2012 • Respiratory Sensitiser 1
Aspiration Hazard	EU/CLP • Data lacking UK CLP • Data lacking UN GHS 9 • Data lacking OSHA HCS 2012 • Data lacking
Carcinogenicity	EU/CLP • Carcinogenicity 2; Suspected of causing cancer UK CLP • Carcinogenicity 2; Suspected of causing cancer UN GHS 9 • Carcinogenicity 2 OSHA HCS 2012 • Carcinogenicity 2
Germ Cell Mutagenicity	EU/CLP • Data lacking UK CLP • Data lacking UN GHS 9 • Data lacking OSHA HCS 2012 • Data lacking
Toxicity for Reproduction	EU/CLP • Toxic to Reproduction 2 UK CLP • Toxic to Reproduction 2 UN GHS 9 • Toxic to Reproduction 2 OSHA HCS 2012 • Toxic to Reproduction 2
STOT-SE	EU/CLP • Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation UK CLP • Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation UN GHS 9 • Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 1; Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
STOT-RE	EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2 UK CLP • Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2 UN GHS 9 • Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2 OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1; Specific Target Organ Toxicity Repeated Exposure 2

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, dyspnoea 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.

Chronic (Delayed) 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) Exposure to dust may cause mechanical 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. Ingestion of large amounts of copper may cause damage to the kidneys.

Chronic (Delayed) Repeated and prolonged exposure to copper may affect the liver.

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
Nickel	7440-02-0	Group 2B-Possible Carcinogen	Reasonably Anticipated to be Human Carcinogen
Cobalt (powder)	7440-48-4	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 (25% TO 70%)	7440-02-0	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Oncorhynchus mykiss (Rainbow Trout) 0.06 mg/L 28 Day(s) NOEC Cyprinus carpio (Common Carp) 0.0035 µg/L Aquatic Toxicity-Crustacea: 7 Day(s) NOEC Americamysis bahia (Opossum Shrimp) 0.213 mg/L
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		Aquatic Toxicity-Algae and Other Aquatic Plant(s): 96 Hour(s) EC50 Pseudokirchneriella subcapitata (Green Algae) 0.233 mg/L
Cobalt (powder) (0% TO 2%)	7440-48-4	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Pimephales promelas (Fathead Minnow) 3.4 mg/L Aquatic Toxicity-Crustacea: 48 Hour(s) LC50 Daphnia magna (Water Flea) 4.4 mg/L 28 Day(s) NOEC Daphnia magna (Water Flea) 0.0028 mg/L
Copper (20% TO 70%)	7440-50-8	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Osteichthyes (Bony Fishes) 0.0051 mg/L, 7 Day(s) NOEC Salmo trutta (Brown Trout) 0.0075 mg/L Aquatic Toxicity-Crustacea: 21 Day(s) NOEC Daphnia magna (Water Flea) 0.002 mg/L, 48 Hour(s) EC50 Ceriodaphnia dubia (Water Flea) 0.001 mg/L Aquatic Toxicity-Algae and Other Aquatic Plant(s): 48 Hour(s) EC50 Chlorella sp. (Green Algae) 0.0011 mg/L, 7 Day(s) NOEC Laminaria saccharina (Tangleweed, Brown Algae) 0.01 mg/L
Iron (0% TO 5%)	7439-89-6	Aquatic Toxicity-Fish: 96 Hour(s) LC50 Mudskipper (Periophthalmus waltoni) 0.00648 mg/L 7 Day(s) NOEC Brown Trout (Salmo trutta) 0.305 mg/L Aquatic Toxicity-Crustacea: 7 Day(s) NOEC Aquatic Sowbug, Isopod (Idotea balthica) 0.5 mg/L
The product is not expected to present an environmental hazard.		
12.2 Persistence and degradability		Material data lacking.
12.3 Bio accumulative 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)

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Inventory						
Component	CAS	UK MCL	UK SVHCs	EU EINECS	EU ELNICS	TSCA
Aluminium	7429-90-5	Yes	No	Yes	No	Yes
Chromium	7440-47-3	Yes	No	Yes	No	Yes
Cobalt (powder)	7440-48-4	Yes	No	Yes	No	Yes
Copper	7440-50-8	Yes	No	Yes	No	Yes
Iron	7439-89-6	Yes	No	Yes	No	Yes
Manganese	7439-96-5	Yes	No	Yes	No	Yes
Nickel	7440-02-0	Yes	No	Yes	No	Yes
Silicon	7440-21-3	Yes	No	Yes	No	Yes

United States

Labour

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed

Environment

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

Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

Copper	7440-50-8	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	7440-47-3	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

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		diameter of the pieces of the solid metal released is >100 µm)
Manganese	7439-96-5	Not Listed
Tantalum	7440-25-7	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	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)
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
Copper	7440-50-8	1.0 % de minimis concentration
Chromium	7440-47-3	1.0 % de minimis concentration
Manganese	7439-96-5	1.0 % de minimis concentration
Cobalt (powder)	7440-48-4	0.1 % de minimis concentration
Aluminium	7429-90-5	1.0 % de minimis concentration (dust or fume only)

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Nickel	7440-02-0	0.1 % de minimis concentration
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
United States - California Environment		
U.S. - California - Proposition 65 - Carcinogens List		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	carcinogen, 7/1/1992 (powder)
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	carcinogen, 10/1/1989 (metallic)
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - California - Proposition 65 - Developmental Toxicity		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed

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U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
Copper	7440-50-8	Not Listed
Chromium	7440-47-3	Not Listed
Manganese	7439-96-5	Not Listed
Cobalt (powder)	7440-48-4	Not Listed
Aluminium	7429-90-5	Not Listed
Nickel	7440-02-0	Not Listed
Silicon	7440-21-3	Not Listed
Iron	7439-89-6	Not Listed
15.2 Incompatible materials	No Chemical Safety Assessment has been carried out.	
15.3 Hazardous decomposition products	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 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. H400 - Very toxic to aquatic life H410 - Very toxic to aquatic life with long lasting effects H412 - Harmful to aquatic life with long lasting effects H413 - May cause long lasting harmful effects to aquatic life
Revision Date	07 November 2022
Preparation Date	13 June 2011
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